

Malakozoologischen Gesellschaft, 8° *Frankfurt am Main*, M. Diesterweg, 1883; vol. xv., pp. 58, 59.

Pisidium arcticum West. p. 58.

Pisidium nivale West. p. 59.

Pisidium glaciale West. p. 59.

All collected by the Vega expedition at Port Clarence, Alaska, near Bering Strait.

LIST OF FISHES COLLECTED AT KEY WEST, FLORIDA, WITH NOTES AND DESCRIPTIONS.

By DAVID S. JORDAN.

Three weeks of the month of December, 1884, were spent by the writer on the island of Key West, in making collections of the fishes in the interest of the United States Fish Commission and of the Indiana University.

The following is a catalogue of the species obtained, with color notes and other descriptive items. One hundred and seventy-one species in all were obtained. None others are included in the list, and the vernacular names here given are those only which are in use among the English-speaking fishermen of Key West. These fishermen are mostly from the Bahamas, where essentially the same nomenclature of the different species has long prevailed. Spanish names are also heard at Key West, but as these have been very exactly given by Professor Poey, I have not thought it best to introduce them here.

The general character of the fisheries of Key West has been elsewhere discussed by me (Bull. U. S. Fish Comm., 1884).

All the fishing is done with the hook and line. Most of it is for bottom fish (groupers, snappers, grunts, porgies, &c.) in the channels between the Keys, at moderate depths. In the season the larger scombroid fishes (notably the king-fish) are caught by trolling. The bottom fishes are brought to the market alive in the wells of the smacks, and killed to suit purchasers. Of these, the grunt, *Hamulon plumieri*, far exceeds in numbers all others.

In collecting, I made all possible use of the aid of the fishermen. About half the species obtained, and all those new to science, were taken with a large "Baird seine," of fine mesh, which was worked by the writer and his volunteer assistant, Mr. William H. Dye, of Indianapolis, Indiana. Every portion of the shore of the island suitable for seining was thoroughly examined. At no other point on the coast of the United States has the writer found small fishes so numerous and varied.

The character of the fauna is in general similar to that of Cuba, but there are numerous differences. Several northern fishes occur at Key West, which do not cross the channel, and many of the most abundant of the Havana market fishes are still not known from Key West. There

is a considerable difference in the temperature of the water at the two localities, and temperature is the chief factor governing the north and south extension of marine fishes.

Most fishes as seen at Havana are more dusky in color than those of the same species at Key West the pale color of the bottoms (of coral sand) of the latter locality may account for this.

Of the fishes inhabiting any considerable depth about Key West, absolutely nothing is known. All the species here named are shore fishes or else free-swimming oceanic species.

The numbers given after the names of the different species are those attached to specimens from this collection in the United States National Museum.

CARCHARIIDÆ.

1. *Carcharias punctatus* (Mitchill). *Shovel-nosed shark*.

(*Squalus* (*Carcharias*) *terra-nova*, Richardson.)

Very common. Not eaten.

2. *Carcharias lamia*. Risso. *Cub shark*.

(*Eulamia longimana*, Poey.)

Very common about the wharves and keys. One $7\frac{1}{2}$ feet in length, taken with a hook from the wharf, showed the following characters: Head, $5\frac{1}{3}$ in total length; snout from mouth, $2\frac{1}{3}$ times in width of mouth; tail, 4 in total length; base of first dorsal, 9; insertion of first dorsal close behind base of pectoral; second dorsal in front of anal, and about equal to it in size, much smaller than first dorsal; base of first dorsal $1\frac{2}{3}$ in interspace between dorsals; base of second dorsal, $4\frac{3}{4}$; pectoral fin, 5 in total length; its greatest width $1\frac{2}{3}$ in its length; its base, $2\frac{1}{2}$.

From a female specimen of similar size 5 or 6 nearly mature foetal examples were taken. Two of these are preserved; one is numbered 35053.

This species is the *Eulamia longimana* of Poey, which most late authors have identified with *C. lamia* of the Mediterranean. Comparing the foetal examples above mentioned with a partly-grown specimen from Venice, we are unable to detect any difference at all likely to prove constant.

3. *Carcharias brevirostris* Poey.

Rather common about the wharves with the preceding, feeding on the refuse fish thrown away by the fishermen. A female $6\frac{1}{2}$ feet long was taken with a hook. This specimen agreed fairly with the description published by Jordan & Gilbert (Proc. U. S. Nat. Mus., 1882, 245), the only differences being evidently due to age.

Color pale olive; no black on the fins. First dorsal of moderate size, inserted well behind the pectoral; pectoral rather long; very wide; its free margin concave, its top reaching to middle of first dorsal; base of first dorsal $2\frac{1}{4}$ in interspace between dorsals; base of second dorsal $2\frac{1}{3}$; second dorsal unusually large, nearly opposite the anal, and about

half larger; caudal fin moderate; the upper teeth are distinctly serrate on both sides of the base.

SPHYRNIIDÆ.

4. *Sphyrna tiburo* L. *Bonnet-head Shark*.

Common.

PRISTIIDÆ.

5. *Pristis pectinatus* Latham. *Saw-fish*.

Rather common, the saws often brought in by the fishermen.

TORPEDINIDÆ.

6. *Narcine umbrosa*, sp. nov.

Two young male specimens, 10 to 11 inches in length, taken. The color is exactly alike in both, and is materially different from that given in any of the descriptions of *Narcine brasiliensis* or of the related variety or species *Narcine corallina* Garman (= ? *Torpedo bancrofti* Griffith). Light brown; tip of snout blackish; a large black triangular area before each eye, covering most of the front of the disk; space between eyes pale; space between spiracles mostly pale; a round black blotch on median line behind this; a round blotch behind and outward from each spiracle; another near this on the edge of the disk; another behind this on the edge of the disk; a large transversely oblong blotch in line with this on each side of the median line; posterior part of disk with a dark blotch near the edge; a large black blotch between angle of pectorals and ventrals; ventrals each with two dusky blotches, the posterior one on the elaspers; a dusky blotch on the back of the tail between them; each dorsal in a distinct black cross blotch, which extends up on the fins; a dark blotch on the tip of each dorsal and three on the caudal; in all about 30 distinct dusky spots and blotches above, all of them larger than the eye. There are also some rows of dark dots, apparently the mouths of pores, along each side of the tail above, near its base, and along the sides of the disk.

General form of the body more like that of *N. timlei* than that of *N. brasiliensis*; the disk very nearly circular, very slightly broader than long; the snout broadly rounded, and not at all exerted; the greatest width of the disk at its middle or opposite the third gill-opening; pectorals extending backward to base of ventrals, but scarcely covering them; spiracles smaller than the eyes, and close to them, their posterior edges roughened. Length of snout from eye, $4\frac{1}{3}$ in length of disk, and double the interorbital width. Nasal valve with a rather distinct rounded median lobe and obscure lateral lobes; edge of valve a little denticulated. Width of mouth about $1\frac{3}{4}$ in preoral portion of snout. Teeth sharp. Tail about $1\frac{2}{3}$ length of disk. Second dorsal a little higher and a little longer than first, the posterior margins of both subtruncate; that of the caudal lunate.

This fish may prove to be simply a variety of *N. brasiliensis* (Olfers), but in any event, the differences which it shows in color and form appear to justify a distinct name. It is apparently not common at Key West, but two specimens being obtained, these being not well known to the fishermen.

TRYGONIDÆ.

7. *Trygon sayi* (Le Sueur). *Stingaree*.

Not very common; one specimen seen.

SILURIDÆ.

8. *Galeichthys felis* (Linnaeus). *Catfish*.

Very common about the wharves, where it is taken with the hook. It is seldom eaten.

It seems impossible to retain *Arius* as a genus distinct from *Galeichthys*. In several species of *Arius* (*brandti*; *dasycephalus*) the covering of the shields of the head by skin is a sexual character. The name *Galeichthys* is entitled to a few pages priority over *Arius*.

9. *Ælurichthys marinus* (Mitchill).

Rare; but one specimen obtained; considered a curiosity by the fishermen.

ENGRAULIDIDÆ.

10. *Stolephorus browni* (Gmelin). *Sardine*.

Exceedingly common in great schools in sheltered bays and in the surf; largely used for bait. (Number 35000.)

11. *Stolephorus perfasciatus* (Poey).

(Not *Stolephorus perfasciatus* Jor. & Gilb.).

A few specimens obtained.

12. *Stolephorus miarchus* Jordan & Gilbert.

A few specimens; not distinguishable from the original types of this species from Mazatlan.

CLUPEIDÆ.

13. *Dussumieria stolifera* Jordan & Gilbert.

Very common in schools in the surf in company with *Stolephorus browni*.

14. *Clupea sardina* Poey.

Not rare in schools in the surf. I doubt the identity of this species with either *Clupea macrophthalma* or *Clupea humeralis*.

Color in life, light green above; a lustrous band along sides; silvery below, with bright reflections, scales often shaded with orange and dotted with black; no black humeral spot, but a yellowish blotch in the scapular region; fins all pale; dorsal and anal yellowish, tipped with

dusky; lower jaw yellowish, dotted with black. Cuban specimens show more orange tinge, orange streaks being distinct along the rows of scales.

Body comparatively deep and compressed; lower jaw projecting; teeth in broad patches on jaws, vomer, palatines, and tongue; maxillary nearly reaching middle of eye; its length, $2\frac{3}{5}$ in head; eye very large, considerably longer than snout, $2\frac{3}{4}$ in head; cheeks and opercles striate; gill-rakers rather few and not long; scales large, firm, but not adherent as in other species of this group (*Harengula*), readily deciduous; each scale crossed by several conspicuous radiating ridges; insertion of dorsal little before that of ventrals, at a point considerably nearer snout than base of caudal; dorsal a little higher than long, its free edge concave; anal low; pectorals nearly reaching ventrals, $1\frac{1}{3}$ in head.

Head $3\frac{1}{3}$ in length to base of caudal; depth, $3\frac{1}{3}$; D. 1, 15; A. 18; Lat. l. 36. Ventral scutes about $15 + 10$. Length of specimen described about 8 inches. Specimens in National Museum are numbered 34993.

15. *Clupea pensacolæ* (Goode & Bean). *Pilchard*.

Exceedingly common, in large schools. Our specimens agree fully with others from Cedar Key and Pensacola. The species much resembles the Cuban one for which Poey has adopted the name *Cl. clupeola*. The latter is, however, constantly more elongate, and differs in some other respects.

Key West specimens, in life, were light green above; a lustrous yellow streak along sides; no humeral spot; fins all pale; the caudal lobes dusky at tip; upper part of eye dark; scales of back dark-edged.

ALBULIDÆ.

16. *Albula vulpes* (Linnæus). *Bone-fish*.

Not rare. The "bone-fish," elsewhere in the United States, held in low esteem as a food-fish, is highly valued at Key West.

ELOPIDÆ.

17. *Elops saurus* Linnæus. *Tenpounder*.

Not rare. A food fish of moderate value.

18. *Megalops atlanticus* (Cuv. & Val.). *Tarpum*.

Occasionally taken.

SYNODONTIDÆ.

19. *Synodus fœtens* Linnæus.

One large specimen taken.

20. *Synodus spixianus* Poey. *Sand-fish*.

Common; taken with the seine in sandy or muddy bottom. None of the specimens seen are more than 9 inches long.

Sandy gray in life, light or dark, the upper parts much mottled with darker olive; branchiostegals pale yellowish; top of head without vermiculations; dorsal scarcely barred; caudal dusky; other fins pale, with little or no yellow; lower parts of head mottled with dusky; no scapular spot; tip of snout not black.

This species is very close to *S. fætens*, and may possibly be found to intergrade with it. In our specimens the teeth are rather stronger than in *S. fætens*, the jaws a little longer, the upper $1\frac{1}{2}$ in head; dorsal shorter and higher than in *S. fætens*, the anterior rays when depressed extending beyond the tips of the last rays, $1\frac{3}{4}$ in head. Scales as in *S. fætens*; pectorals 2 in head; ventrals $1\frac{1}{4}$. D. 1, 9; A. 11 or 12; Lat. l. 60.

Specimens from Cuba agree with these from Key West. One of the Key West specimens is numbered 35098.

21. *Synodus cubanus* Poey. Miller's Thumb.

(*Saurus intermedius* Günther, v, 396, not of Agassiz and Spix; *Synodus intermedius*, Jor. & Gilb, Proc. U. S. Nat. Mus., 1882, 249, and Syn. Fish. N. A., 1883, 889; *Synodus cubanus*, Poey, Enum. Pisc. Cubens., 1875, 143.)

Common about rocks, reaching a considerable size (18 inches). Often taken with the hook but not used as food. Our specimens appear to belong to the same species as those from Pensacola, formerly called by us *Synodus intermedius*. They seem also to be identical with Poey's *S. cubanus*, although differing in some slight respects. The fish called by Poey *Synodus intermedius* (Enum. Pisc. Cubens., 1875, 143) of which we have numerous specimens from Havana, is still another species, having the mouth smaller than in *S. cubanus*, the scales larger (lat. l. 45), and the scapular region without distinct black spot. This species is apparently the original *S. intermedius* of Spix and Agassiz, not yet known from our coasts.

The life colors of large specimens of *Synodus cubanus* are as follows:

Back olive-gray, with blotches of dark olive-brown; these irregular in form and size and mingled with smaller ones; eight or nine on back, nine on sides; those on the sides not quite below the dorsal blotches, but more or less in advance of them, especially anteriorly; a dark blotch at base of caudal; an inky blotch on scapula, hidden by the opercle; top and sides of head mottled like the body; no yellow below head; jaws orange within; breast with a brown line along each series of scales; two rows of scales on lower part of sides, with an orange spot on each scale, forming continuous stripes; belly white; dorsal with olive bars formed of coalescent spots and with whitish spots; caudal yellowish, with olive-brown bars; pectorals similar; ventrals yellowish, the rays bluish white; anal yellow, whitish at base.

A specimen from Key West is numbered 35045.

CYPRINODONTIDÆ.

22. *Lucania parva* (Baird & Girard). *Rain-water fish.*

(? *Cyprinodon parvus* Baird & Girard, Ninth Smithsonian Report, 1845, 345;
Lucania parva, Jor. & Gilb., Syn. Fish. N. A. 893.)

Very common in shallow waters and tide pools close to the shore, especially where fresh waters soak in to the sea. Length, $1\frac{1}{2}$ to 2 inches.

Color in life: Males, olive, with bluish reflections; edges of the scales darker; dorsal dusky orange, with a large black spot at the base in front, ocellated with orange; caudal orange-yellow, tipped with black; ventrals and anal orange-red, tipped with dusky; pectorals translucent. Females larger, the fins pale olive, without black spot or edgings.

Our specimens have the body deeper than in *L. venusta*, the depth being about $3\frac{1}{4}$ in length. In other respects they agree closely with the latter. They are apparently identical with specimens from Eastern Florida referred by Dr. Bean to *Lucania parva*, a species described originally from Long Island, and known to me only from Dr. Bean's notes. Head, $3\frac{1}{2}$ in length; D. 1, 10; A. 10; scales 26—8.

23. *Fundulus similis* Baird & Girard. *Sac-a-lai.*

Very abundant in lagoons and tide-pools, reaching an unusually large size.

24. *Fundulus heteroclitus* Linnaeus. *Mud-fish.*

Fundulus grandis Baird & Girard.

With the preceding; less abundant than farther north.

25. *Cyprinodon riverendi* Poey.

Trifarcinus riverendi Poey, Memorias Cuba, ii, 306, 1860.

Rather common in shallow waters near the shore; reaches a length of $2\frac{1}{2}$ inches. This species is very close to *Cyprinodon gibbosus* B. & G. (the Gulf representative of *C. variegatus*), but with larger scales, smaller head, and the anal edged with black. The nominal genus, *Trifarcinus*, based on the presence of six branchiostegals, is identical with *Cyprinodon*; the same number being found in *Cyprinodon variegatus*, contrary to the statement of Valenciennes.

Male in life with the antedorsal region lustrous steel blue, as in *C. gibbosus*; the rest of the body olivaceous, obscurely clouded, but without dark cross-bars. A black bar at base of dorsal; a dark shade below eye; anal and caudal edged with black; ventrals and anal red; dorsal dusky, edged with orange; pectoral plain, tipped with orange and blackish.

Female more silvery; the back olivaceous and speckled; the sides with about 13 blackish bars, which do not reach the back; these alternately broad and narrow; no yellowish shades; a dusky bar through

eye; lower fins whitish; upper pale; dorsal fin with a black ocellus; a dark band across base of caudal.

Head $3\frac{1}{2}$ in length; depth, 2. D, 10; A, 9. Scales 24—12.

26. *Cyprinodon mydrus* Goode & Bean. *Pussy gut*.

(? *Cyprinodon carpio* Günther, vi, 306.)

Exceedingly abundant in lagoons and shallow shores. A strongly-marked species, larger than most others of the genus, reaching a length of 3 inches.

Body comparatively elongate, rather strongly compressed; head large; profile not very steep; fins rather low, the dorsal and anal not nearly reaching caudal; humeral scale not larger than the others. Eye in adult $3\frac{1}{2}$ in head. Scales very thick and firm, those on lower parts of body less reduced in size than usual. Pectorals reaching middle of ventrals, which reach vent. Head, 3; depth, $2\frac{2}{3}$. D. 11; A. 9. Scales 24—9.

Male in life, light olive; sides silvery, with six narrow faint bars of coppery; sides with a number of spots of bright clear yellow, besides the blotches of orange found in the females. Lower jaw mostly golden; three bright yellow stripes obliquely across the cheeks to the jaws. Dorsal and caudal finely speckled with olive. Tip of dorsal orange, as also the lower edge of caudal and anal; ventrals orange-red; no ocellus on dorsal.

Female pale, with numerous blotches of light bright orange, these mostly longitudinally oblong on upper parts and irregular or vertical below; sides of head marked with bronze; lower jaw whitish; fins plain; dorsal and caudal slightly yellow. Young females with traces of one or two dusky bars at base of caudal. Still younger specimens (as in the original types) nearly plain silvery.

MURÆNIDÆ.

27. *Sidera funebris* (Ranzani). *Green Moray*.

(*Gymnothorax funebris* Ranzani, Nov. Comm. Ac. Sci. Inst., Bonon., iv, 1840, 76; *Murœna afra* Günther, viii, 123; apparently not *Gymnothorax afer* Bloch; *Murœna infernalis* Poey, Mem. Cuba, ii, 347.)

Rather common, reaching an enormous size; a specimen obtained being about five feet in length, and it is said to attain double that length. It is not used for food. It is much disliked by the fishermen, as its bite is often serious, and it tangles or destroys their lines. It lives in crevices in the reefs, and it is said that it frequently bites off the heads of cormorants and other water birds who venture near its holes.

In life it is bright yellowish-green, with some oblique dark streaks on the fins; after death the green rubs off readily, as a sort of slime, leaving the skin brown beneath. In spirits the color is a uniform purplish-brown.

This is probably not the *Gymnothorax afer* of Bloch, described from a specimen from the coast of Guinea, as *afer* is said to be brown, marbled

and banded with white. After rejecting this name, the name *funnebris* of Ranzani appears to have the right of priority.

28 *Sidera moringa* Cuvier. *Moray; Helmet.*
(*Gymnothorax rostratus* Agassiz.)

Very common about the reefs. It reaches a length of two or three feet. It is seldom brought to the market, and is eaten only by the Cubans, although it has not the reputation of being poisonous possessed by *S. funnebris*.

Ground color, greenish-white above; quite yellowish-green on dorsal fin and back; head and belly pearly tinged; anal and posterior part of dorsal with the edge slightly paler. Entire body and fins everywhere almost equally marked with dark olive confluent, roundish, but irregular, spots, mostly smaller than pupil, but some of them larger than eye. These are sometimes so numerous as almost to exclude the ground color; at other times so sparse as to render the fish comparatively pale. Mouth spotted within; no black at angle of mouth or around gill opening.

Specimens from Cuba are darker, the spots being more numerous, but they do not differ otherwise. The name *Moray* appears to be universal for this species among the English-speaking fishermen. A specimen paler than usual was brought to me as a different species, under the name of "*Helmet*."

The darker variety is probably the original of Catesby's "*Muraena maculata nigra*, the Black Moray," on which figure the *Muraena moringa* of Cuvier was founded. If this view should prove erroneous it will be necessary to again use the name *rostrata* for this species.

A specimen from Key West is numbered 35036.

ANGU LLIDÆ.

29. *Anguilla rostrata* (Le Sueur).

A single extremely young eel was taken in a seine in *Enteromorpha* in the harbor. The species seems to be entirely unknown to the Key West fishermen; nor did I find any who had ever heard the word "eel." The species of this genus apparently seldom venture far from the brackish or fresh waters.

SCOMBERESOCIDÆ.

30. *Tylosurus notatus* (Poey). *Gar-fish.*

Very common, in large schools close to shore. As many as four hundred were taken in a single haul of the seine. This species reaches but a small size, the largest seen being less than 18 inches long.

Color in life, very pale greenish, the lateral line bluish, the edges of the scales with many dark points; a blue-black line bounding the base of lower jaw above. Tips of all the vertical fins of a pale brick-red; middle of caudal dusky. A deep blue-black spot on upper front of opercle.

This species is rarely used as food, from its small size.

Three specimens from Key West are numbered 34998.

31. *Tylosurus sagitta* Jor. & Gilb.

Not common. Three specimens taken with the seine at the same time.

32. *Tylosurus crassus* (Poey). *Hound-fish*.

(? *Belone raphidoma* Ranzani, Nov. Comm. Act. Inst., Bonon., v, 1842, 359;
Belone crassa Poey, Mem. Cuba, ii., 1860, 291; *Belone jonesi* Goode,
 Amer. Journ. Sci. Arts, 1877, 295; *Belone jonesi* Günther, Ann. Mag.
 Nat. Hist. iii, 1879, 150; *Tylosurus gladius* Bean, Proc. U. S. Nat. Mus.,
 1882, 430).

Common in schools about Key West; the young very abundant. It reaches a length of 4 feet, and the large specimens are occasionally brought to market. The variations in age with this species are considerable, the adults having the beak considerably more robust and proportionately shorter than the young. We have compared our Florida specimens with numerous others, young and old, from Cuba, and can find no difference. One of the larger ones corresponds exactly to the type of *Tylosurus gladius* as described by Dr. Bean.

Body robust, especially in the adult, somewhat deeper than broad; the tail rather depressed, broader than deep; beak rather short and stout, becoming proportionately shorter with age, and its length $1\frac{2}{3}$ to $1\frac{5}{6}$ that of rest of head; teeth strong, green; eye large, about $2\frac{1}{3}$ times in postorbital part of head; maxillary covered by preorbital; top of head with a very broad and shallow median groove; the middle and posterior parts of the head covered with smooth transparent skin; supraorbital bones broad, prominent, finely striated; two folds of translucent skin crossing preopercle above, and one near its angle; pectorals rather longer than postorbital part of head, their upper ray broad; anal and dorsal falcate, subequal, opposite, their posterior rays elevated in the young, but becoming very short in the adult; ventrals well developed; caudal large, the lower lobe much the longer, $2\frac{2}{3}$ in head. Head $3\frac{1}{2}$ in length; depth 13 to 15; D. 1,21 to 1,24; A. 22 to 24; scales minute, but evident.

Color in life deep, clear green above, white below; no lateral stripe; sides with a row of large, round, dusky blotches, distinct only in the young, and fading in spirits; jaws with blue shades; axil dark; a dark bar behind cheek; pectoral broadly blackish at tip; more or less of dusky shading on dorsal, caudal, and ventrals; no red anywhere; lateral line forming a low black keel on caudal peduncle; bones green.

Three specimens from Key West are numbered 35039.

33. *Hemirhamphus unifasciatus* Ranzani. *Balaó* ("Bally-hoo".)

(*Hemirhamphus richardi* and ? *H. picarti* Cuv. & Val.)

(*Hemirhamphus fasciatus* Poey; *Hemirhamphus poeyi* Günther.)

Extremely abundant about Key West, in large schools in quiet water; taken in large numbers with the seine. Specimens entirely similar also obtained at Havana.

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Color in life clear, light greenish; the dots on the scales above lateral line all clear blue-black, these giving the fish a decidedly bluish cast; a bluish-silvery lateral band; head mostly light blue above, the brain cavity appearing yellowish; sides of head iridescent silvery; lower jaw bluish above, its flap white with a blackish edge, its tip scarlet; side of lower jaw blue at base; dorsal and pectoral bluish; caudal light reddish edged with blackish; ventrals and anal pale, the latter tipped with blackish.

This species is very close to *Hemirhamphus roberti* Cuv. & Val. (*H. unifasciatus* of most late writers), from which it seems to differ chiefly in the shorter beak and the more robust and less compressed body. The number of dorsal rays is usually one or two less.

Lower jaw from end of upper longer than rest of head and 6 to 7 in total length from its tip to base of caudal (about $4\frac{1}{2}$ in *H. roberti*); head with lower jaw 3 in length; body but half deeper than broad; premaxillaries broader than long; eye less than interorbital width, three-fifths postorbital part of head; insertion of ventrals midway between eye and base of caudal; dorsal and anal densely scaly; back broad above.

Head, $4\frac{5}{8}$ in length; depth, $6\frac{1}{2}$. D. 12 to 14; A. 15; Lat. l. 52. Length, 12 inches.

I know from comparison of specimens that this species is identical with the Cuban one called by Dr. Günther *H. poeyi*. *H. richardi* C. & V., distinguished from *H. roberti* and other species by the shorter snout seems to be the same, as is probably *H. picarti* also. The figure given by Ranzani represents the short-beaked form, which is apparently the common *Hemirhamphus* of the West Indies, while the *H. roberti* C. & V., is best known from the southern coasts of the United States. There is not much doubt, therefore, that it is for the former that the name *H. unifasciatus* of Ranzani was originally intended.

Both *H. unifasciatus* and *H. roberti* occur on the Pacific coast of Mexico and Panama, but the latter is not yet known either from Key West or Havana.

Young specimens of *H. unifasciatus* have the lower jaw proportionately longer and are not easily separated from *H. roberti*. Comparing specimens of the same size it will be found that the latter is always in all parts more slender, although the difference is not very great.

Four examples from Key West are numbered 34999.

34. Hemirhamphus balao Le Sueur. *Balaó*.

(*Hemirhamphus balao* and *marginatus* Le Sueur; *Hemirhamphus pleii* Cuv. & Val.; *Hemirhamphus filamentosus* Poey; *Hemirhamphus brasiliensis* Jor. & Gilb., Syn. Fish, N. A., 902; probably not *Esox brasiliensis* L., or *Hemirhamphus browni*, C. & V.)

Very abundant about Key West, in large schools in water of moderate depth, always frequenting the sheltered side of wharves, bars, &c. It

reaches a length of about 15 inches. It is rarely brought into the markets, although an excellent pan-fish.

Color in life deep clear blue-green above, much darker than in *H. unifasciatus*; sides silvery. No distinct lateral band. Beak dark, its tip bright orange; its membrane edged with white. Lobe of dorsal and upper lobe of caudal always of an intense orange-yellow, which is deepest toward the tip. Ventrals tipped with yellow. Fins otherwise pale. Sexes colored alike.

Insertion of ventrals about midway between base of caudal and middle of pectoral.

We have elsewhere used the name *brasiliensis* for this species, but this arrangement seems hardly allowable. *Esox brasiliensis* L. is based on two descriptions, the one of a *Tylosurus* from Brazil, which suggested the name *brasiliensis*, the other of a *Hemirhamphus* from Jamaica. The last is thought by Valenciennes to be identical with his *H. browni*. *H. browni* is said to have 65 scales in the lateral line. If so, it must be a species different from *H. balao*. In any event, the name *brasiliensis* should, I think, be restricted to that one of its component species which came from Brazil, that is, to the *Timucu* of Maregrave.

A *Hemirhamphus* of this type occurs on the Pacific coast of Mexico. As, however, it has no conspicuous orange on its fins, it will probably prove to be a different species.

Two examples from Key West are numbered 35044.

35. *Chriodorus atherinoides* Goode & Bean. *Hard-head*.

Excessively abundant in sandy bays on the sheltered side of the island. It reaches a length of about 10 inches, and is known to the fishermen as "hard-head." It is an excellent pan-fish, but from its small size it is seldom brought to the markets. Like the *Hemirhamphi*, it feeds chiefly on green algae.

Translucent greenish above, with dark dots on the scales; sides silvery, a bright silvery lateral band as in *Atherina*. This is broadest under the dorsal fin, where it is about as wide as the pupil.

Head, $4\frac{2}{3}$ in length; depth, $5\frac{2}{3}$. D. 1, 15 or 1, 16; A. 1, 15; Lat. 1. 18. Interorbital space a little broader than eye in adult; eye, $3\frac{5}{8}$ in head; snout, 3. Scales rather firm; bones of top of head smooth, hard, translucent.

Eleven specimens from Key West are numbered 35102.

SYNGNATHIDÆ.

36. *Siphostoma floridæ* Jor. & Gilb.

Not rare.

37. *Siphostoma affine* (Günther).

Very common in algae everywhere about the island of Key West.

38. *Siphostoma louisianæ* (Günther).

Common.

39. *Siphostoma mackayi* Swain & Meek.

Numerous specimens taken with the seine in eel-grass. Types of the species are numbered 34989, from Key West.

40. *Siphostoma miurum* Swain & Meek.

One specimen obtained, the type of the species.

41. *Siphostoma crinigerum* Bean & Dresel.

Numerous specimens.

42. *Siphostoma zatropis* Jor. & Gilb.

Several large specimens taken in eel-grass.

43. *Hippocampus punctulatus* Guichenot. *Sea Horse*.

A single dried specimen, in poor condition, obtained from a fisherman.

44. *Hippocampus hudsonius* DeKay.

Two specimens, one nearly adult, one very small, taken with the seine in Fucus.

The large specimen evidently belongs to the species described by Jordan & Gilbert (Syn. Fish. N. A., 907) as *Hippocampus hudsonius*.

Color dusky, without distinct spots, but with irregular, sharply-defined grayish lichenoid blotches on head, body, and tail, not quite symmetrical on the two sides, but nearly so, those on the tail forming irregular pale bands. Head freckled with grayish.

Eye with radiating whitish streaks; snout with a narrow, whitish cross-band, a whitish longitudinal band behind eye. Dorsal mottled. Snout, $1\frac{1}{3}$ in rest of head. Spines comparatively blunt, but some of them large, the four on median line of belly especially so. D. 19, covering $3\frac{1}{2}$ rings; 11 body rings. Opercle with radiating striæ.

It is not very certain that DeKay's specimen belonged to this species. His description fits this better than it does any other of the four which are definitely known from our Atlantic coast (*punctulatus*, *hudsonius*, *stylifer*, *zosteræ*). The species described by Professor Goode (Proc. U. S. Nat. Mus., 1878, 45), from Saint George's Bank, as *Hippocampus antiquorum*, is apparently more like the present species than like the European *H. hippocampus* (*antiquorum*, *heptagonus*). The latter species should probably be omitted from the list of American fishes.

MUGILIDÆ.

45. *Mugil albula* L. *Callifavor Mullet*.

Common in the fall. Only salted specimens seen. I do not know the origin or the proper orthography of the name "*Callifavor*" applied to this species by the fishermen.

46. *Mugil brasiliensis* Agassiz. *Blue-back Mullet*.

Rather common in the winter in schools, in bays where the water is somewhat deep. The most valued as food of the species of mullet at Key West.

This is the species called by Poey *Mugil gaimardianus* and is apparently the *Mugil gaimardianus*, Desmarest, figured in 1831, but so far as I know never described.

47. *Mugil trichodon* Poey. Fan-tail Mullet.

Very common about Key West, the young taken in large numbers in the seine. It reaches a smaller size (about a foot) than any of the other American species, is more robust in form, and has much larger scales than any other, except *Mugil liza*, which it resembles in no other respects.

Color in life silvery, light olive above, unstriped; a narrow groove at base of each scale on back, top of head and on sides; base of pectoral dusky-bluish. Soft dorsal and caudal narrowly edged with blackish; middle of anal dusky; eye very large, pale, its adipose membrane large and transparent.

Body deeper than in related species, compressed; head short, not very obtuse. Interorbital space convex, its width $2\frac{1}{2}$ in head. Eye, $3\frac{4}{5}$ in head. Maxillary mostly concealed by the preorbital; lower jaw acute in front, the angle formed by the dentary bones rather more than a right angle; dentiform papillæ much longer than in *Mugil brasiliensis* (although much shorter than described in *Mugil trichodon*), rather stiff. Upper lip unusually thick; its depth in front half diameter of eye; tongue with asperities; pectoral $1\frac{1}{3}$ in head, its tip not reaching front of dorsal by a distance equal to three-sevenths of its own length; soft parts of vertical fins densely scaly; free edge of dorsal and anal much concave; first dorsal spine $1\frac{4}{7}$ in head; caudal broad and rather short, its lobes as long as head.

Head, 4 in length; depth, $3\frac{4}{5}$; D. IV, -1, 8; A. III, 8. Scales, 34-12.

This is probably *Mugil trichodon* Poey, although his description indicates a fish with longer head, slenderer body, shorter dorsal spines, and longer dental cilia.

48. *Querimana gyrans* Jor. & Gilb.

Abundant in small schools about the wharves. Swimming at the surface close together, like "Whirligig-beetles" (*Gyrinidæ*). It is not likely that these fishes reach a length of more than 2 inches and they are most assuredly not the young of any species of *Mugil*.

ATHERINIDÆ.

49. *Atherina laticeps* Poey. Sardine.

?*Atherina stipes* Müller & Troschel.

Atherina laticeps Poey.

Atherina relicana Goode & Bean.

Extremely abundant everywhere about the island, swimming in schools. Often used as bait. It reaches a length of less than 3 inches. It is readily distinguished from related species by its broad head, thick body and large eye.

It is also not uncommon in Cuba, numerous specimens being seen in the Havana market. These are, as usual with Cuban fishes, somewhat darker in color than Key West specimens, but are not otherwise different. There is, therefore, no doubt of the identity of *A. veliciana* with *A. laticeps*. The account of *A. stipes* given by Dr. Günther agrees very well with our specimens, but it is hardly sufficiently detailed to warrant the substitution of the name *stipes* for that of *laticeps*. In one or two slight respects the description of Poey (Memorias, II, 265) is erroneous. Thus the pectorals form rather more than one-sixth the length of the body, even including the caudal fin, and the insertion of the first dorsal is in front of the middle of the body, if this fin be included, and behind it if it be excluded.

Color in life translucent green, silvery, below with a well-defined silvery lateral band; a series of dots along the side below this; back with dark dots forming streaks along the rows of scales; snout above with black dots; fins pale, nearly plain. A dusky shade at base of caudal.

Eye, $2\frac{1}{3}$ in head; snout, 4; interorbital space, $2\frac{1}{3}$. Head, $3\frac{2}{3}$ in length; depth, $4\frac{2}{5}$. D. V-1, 9; A. 1, 11. Scales, 36-6. Insertion of first dorsal rather nearer anal than ventrals. Upper edge of orbit sharp, nearly smooth. Maxillary reaching front of pupil.

50. *Atherina aræa* Jor. & Gilb.

Not very common. A small, slender fish, found in schools of the preceding.

SPHYRÆNIDÆ.

51. *Sphyræna picuda* Bloch & Schneider. *Barracuda*.

Very abundant, reaching a length of 4 or 5 feet or more. Considered an excellent food-fish, although regarded with a little suspicion, as it is said to be sometimes poisonous. The poisonous character of this and various other suspected fishes is said to be confined to those taken on the growing reefs, and it is thought to be due to some animal eaten by the fishes.

In the sheltered places among the wharves at Key West are vast schools of *Atherina*, *Stolephorus*, and *Dussumieria*. These swim near the surface, and among them and feeding on them, likewise swimming at the surface, are the species of *Tylosurus*. Lower down in the water are the Pilchard (*Clupea pensacola*), and among these are the Barracuda, little and big, the most voracious of all the fishes at Key West. They hover midway in the water, motionless, except for the undulations of the pectoral fins, finally darting with great swiftness into some school of smaller fishes.

The resemblance of the Barracuda in habits to the fresh-water pike (*Esox*) is very great, and both are very destructive to small fish.

Three specimens from Key West are numbered 35034.

POLYNEMIDÆ.

52. *Polynemus virginicus* Linnaeus. (*Polynemus plumieri* (Lacépède).)

Two very young specimens taken in the surf. There is not much doubt that this is the species intended by Linnaeus, in his description of *Polynemus virginicus*, although the character "*cauda integra*" does not apply to any *Polynemus*.

Silvery, back and upper part of sides dotted with blackish; lower lobe of caudal and tips of dorsals partly black; pectoral pale; pectoral filaments reaching a little past vent.

In older specimens from Cuba the speckled coloration disappears; the pectoral becomes largely black, and the other fins grow more dusky, the markings on the caudal becoming more diffuse.

ECHENEIDIDÆ.

53. *Echeneis naucrates* Linnaeus. *Sucking-fish*; *Sucker*.

Very common. Found attached to sharks, groupers, or any other large fish, without regard to species. Few large sharks are without them. Often caught with hook and line from the wharf, where they frequently forsake their host to take the bait.

TRICHIURIDÆ.

54. *Trichiurus lepturus* Linnaeus. *Silver-fish*.

One large specimen taken; more abundant in summer.

XIPHIIDÆ.

55. *Histiophorus americanus* Cuv. & Val. *Spike-fish*.

(? *Histiophorus gracilirostris* and ? *H. ancipitirostris* C. & V., VIII, 1831, 308, 309.
? *Makaira nigricans* Lacépède, IV, 688, 1803.)

One large specimen taken with trolling hook. As no description has yet been published of an American *Histiophorus*, I give the following notes on this specimen, the skin of which is preserved:

Bluish-black, paler below; dorsal dusky-bluish; its membranes with many almost perfectly round black (not blue) spots, which are from one-third to one-fourth diameter of orbit.

Snout from eye $2\frac{2}{5}$ times length of rest of head. Lower jaw $2\frac{1}{2}$ in head. Front of eye nearly midway between tip of lower jaw and edge of opercle. Interorbital space broad, flattish, $1\frac{2}{5}$ in postorbital part of head. Maxillary reaching to slightly beyond eye, which in $3\frac{1}{3}$ in postorbital part of head and 10 times in length of snout. Sword narrow, regularly tapering, depressed, its upper and lower surfaces rounded, less rough than the blunt edges. Sword nearly twice as broad as deep for its entire length. Breadth of sword at a point midway between its tip and the front of eye contained twenty-five times in its length from the eye. Longest dorsal spine three-fourths length of head. Ventrals, $1\frac{5}{8}$ in head. Pectorals, $2\frac{2}{5}$; caudal lobes, $1\frac{7}{8}$.

Head about $2\frac{2}{3}$ in length ($3\frac{1}{4}$ with caudal); depth about 6. D. XLI-7; A. 9-7. Length of specimen, 6 feet.

This specimen differs considerably from the current descriptions of *H. gladius*. The sword is much longer and more slender, and the number of dorsal spines is less.

It is probable that this is, as recently suggested by Mr. Goode, a distinct species, for which the name *americanus* should be retained.

The much discussed *Makaira nigricans* of Lacépède (IV, 688, 1803) is probably the same species, but the description is altogether insufficient for identification.

SCOMBRIDÆ.

56. *Acanthocybium solandri* (Cuv. & Val.). *Wahoo*.

(*Cybium solandri* Cuv. & Val., 1831.)

Cybium sara Bennett, 1849.

Cybium petus Poey, 1860.

Cybium veranyi Doderlein, 1872.)

Not very common about Key West. A single large specimen taken. Called by the fishermen "Wahoo," by the Cubans "Peto."

Iron gray, dark above, paler below; fins colored like the body; no distinct markings anywhere. Gape more than half length of head; eye 5 in snout; premaxillaries in front produced in a sort of beak, which is nearly half length of snout; teeth somewhat irregular, trenchant, ovate, or subtruncate in form, their edges finally serrate, the posterior teeth much the largest; villiform teeth on vomer and palatines. Dorsal spines mostly subequal, the highest behind the middle of the fin, $5\frac{2}{3}$ in head. Dorsal and anal lobes low. Caudal lobes short, very abruptly spreading, their length about two-thirds head. Pectoral not quite half head.

D. XXIV-1, 12-IX; A. 1, 12-IX.

57. *Scomberomorus cavalla* (Cuvier). *Kingfish*.

(*Cybium caralla* Cuvier, 1829, after Maregrave.)

Cybium caballa and *immaculatum* Cuv. & Val., 1831.)

One of the most important food-fishes of the Florida Keys in the time of its runs (December to April). It is taken with a trolling-line, and is brought into the market in great numbers. It is justly considered one of the best of the food-fishes, having firm, well-flavored flesh. The first of the run (November, early December) sell at high prices. Later, however, they become cheap, and their abundance interferes with the profits of the fishermen who seek for "bottom-fish" (*Epinephelus*, *Hamulon*, *Lutjanus*, &c.). The usual weight of the kingfish is from 6 to 40 pounds, but specimens still larger are occasionally taken.

Iron gray, adult nearly or quite immaculate and without black blotch on anterior part of spinous dorsal; young, paler, and with numerous faint round bronze spots, somewhat as in *S. maculatus*, the spinous dorsal then more or less dusky anteriorly. This reaches a larger size than the others in the genus, and has stronger teeth. Under all circumstances it is readily distinguished by the presence of but 14 (rarely 15)

spines in the dorsal and by the direction of the lateral line, which descends abruptly below the second dorsal, instead of gradually, as in the other American species (*regalis*, *maculatus*, *concolor*), all of which have 17 or 18 spines in the dorsal.

58. *Scomberomorus maculatus* (Mitchill). *Spanish Mackerel*.

Not common; two or three specimens seen. Not distinguished by the fishermen from the next species. Neither are held in special esteem at Key West, and both are less valued than the great kingfish, which reaches a much larger size than they. In this species the spots on the sides never coalesce into a lateral stripe.

59. *Scomberomorus regalis* (Bloch). *Spanish Mackerel*.

Rather common; numerous specimens brought in with the kingfish. Also occasionally taken with hook and line from the wharves. The coloration of this species is similar to that of the preceding, but the bronze spots are rather larger, and one series of them coalesce to form a more or less interrupted narrow lateral bronze stripe. The caudal peduncle and caudal lobes are distinctly slenderer than in *S. maculatus* and the eye is a little larger; the angle of the preopercle is more produced backwards in *S. regalis* and the mouth is perhaps a trifle smaller. There is no difference appreciable in the dentition. The two species are therefore very close, but there is no reason to doubt their distinctness.

60. *Euthynnus alliteratus* (Rafinesque). *Bonito*.

(*Scomber alliteratus* Rafinesque, 1810.

Scomber quadripunctatus Geoffroy St. Hilaire, 1809?

Thynnus thunnina Cuv. & Val., 1831.)

Common, taken with the kingfish, but in much less abundance. A food fish of moderate value, the flesh being considered coarser than that of the kingfish. The black spots on the side of the breast which suggested the name *quadripunctatus* vary somewhat, five being often present. We are not sure as to the priority of date between *quadripunctatus* and *alliteratus*.

CORYPHÆNIDÆ.

61. *Coryphæna hippurus* L. *Dolphin*.

Not uncommon; three adult specimens, taken with troll-hook by kingfish fishermen; one is a male, the other two are females; all with sexual organs well developed. There is no difference in color in the two sexes, the only evident sexual difference being in the great development of the crest on the top of the head in the male.

In life the ground color is a deep, clear yellowish, or olive-green, golden-green on the sides, paler below. In death the green and olive fade rather suddenly to a grayish-silvery, tinged with bluish and with bright reflections, the olive remaining in irregular patches on various parts of the body. The changes in the color in the dying dolphin have been, as Professor Gilbert has already (Proc. U. S. Nat. Mus., 1882, 598)

stated, greatly exaggerated; neither in life nor death does the fish show "all the colors of the rainbow," and its changes in death are not more than the average changes of brightly or delicately colored fishes. They are far less striking than the changes in some species of *Calamus*, especially *C. pennatula*.

The spots on the body remain unchanged in death. There is in the specimens now noticed a row of small ink-like spots of deep blue along the base of the dorsal; these much smaller than the pupil. Middle and lower part of sides with scattered roundish spots of clear blue, paler than those on the back. Dorsal blackish (with bluish blotches after death), and with scattered pale blue spots, most of them ill defined. Caudal plain, anal dusky, paler than dorsal, with blue spots.

Pectoral blackish within, externally pale, its axil dusky, with blue reflections. Ventrals with the rays blackish, the membranes bluish and gilt.

Measurements.

	Male.	Female.
	<i>Times.</i>	<i>Times.</i>
Head in length of body.....	5	4 ⁹ / ₁₀
Depth at ventrals in length.....	4 ¹ / ₃	4 ¹ / ₅
Maxillary in length of head.....	2 ¹ / ₂	2 ¹ / ₁₀
Longest dorsal ray in head.....	1 ¹ / ₃	1 ¹ / ₃
Ventral fin in head.....	1 ¹ / ₄	1 ¹ / ₂
Pectoral fin in head.....	1 ¹ / ₃	1 ¹ / ₃
Caudal lobes in head.....	1 ⁴ / ₅	1 ⁴ / ₅
Eye to first dorsal ray in head.....	1 ⁷ / ₈	2 ¹ / ₈
Number of dorsal rays.....	62	60
Number of anal rays.....	27	29

CARANGIDÆ.

62. *Oligoplites saurus* (Bloch & Schneider). *Leather Jacket.*

Rather common about the wharves. Not used as food.

63. *Caranx bartholomæi* Cuv. & Val. *Yellow Jack.*

(*Caranx eibi* Poey; *Caranx beani* Jordan.)

Not very common; a young specimen taken in the seine.

Color in life deep bronze olive, darker than the adult fish, the ground color forming reticulations around blotches of light yellow. A dark bronze bar below eye. Fins yellowish.

64. *Caranx chrysos* (Mitchill). *Runner.*

Rather common; brought in by hook-and-line fishermen. Specimens less golden in color than usual with this species.

In life dull green above, silvery below; fins all pale; opercular spot obscure; axil dusky; iris greenish-yellow. Some specimens showed faint yellowish shades below and traces of faint darker cross shades.

65 *Caranx latus* Agassiz. *Horse-eye Jack.*

(*Caranx fallax* Cuv. & Val.)

Very common; the young taken in seines along the shore; the adult swimming in considerable schools, and often taken with hook and line from the wharves.

Color in life silvery; olive above, scarcely tinged with golden below; iris coppery, the adipose eyelid very large, and covering its posterior half. A very small, but distinct black opercular spot. A distinct shade of dusky on lower part of pectoral toward the base, suggesting the black pectoral spot of *C. hippos*. Caudal rather bright yellow; other fins plain grayish; soft dorsal and caudal edged with darker. Ventrals white. This species rarely exceeds 15 inches in length.

66. *Caranx hippos* L. *Jack*.

Common in the deep waters, and taken with hook and line. This species reaches a length of 3 to 4 feet, and is a food fish of fair quality.

67. *Caranx crinitus* Mitchill. *Sunfish*.

A single specimen about 15 inches long obtained. The species is not uncommon.

68. *Selene vomer* (L.) *Moonfish*.

A single young specimen of the style known as "*Argyriosus vomer*" obtained. Probably not uncommon.

69. *Seriola lalandi* Cuv. & Val. *Amber Jack*.
(*Seriola gigas* Poey.)

Rather common; a food-fish of some importance; taken with the trolling-line. Numerous large specimens (20 to 30 pounds) seen, and one small one obtained. It is said to reach a weight of 100 pounds.

Coloration essentially as in *S. dumerili*. Dorsal fin dusky, with a light yellow submarginal band. Pectoral dusky yellowish; ventrals yellow and blackish; anal blackish, with pale edge. Young and old specimens have essentially the same general form, being at all stages more slender than *S. dumerili*.

Depth, $3\frac{3}{4}$ to $4\frac{1}{4}$ in length; head, $3\frac{1}{2}$ to $3\frac{3}{4}$. Soft dorsal, 1, 34; A. 1, 21. Dorsal lobe, $2\frac{1}{3}$ in head. Maxillary, $2\frac{1}{5}$.

70. *Seriola dumerili* (Risso). *Almicore; Amber fish*.
(? *Trachurus alvicolus* Rafinesque, 1810.
Trachurus fasciatus Rafinesque, 1810.
Caranx dumerili Risso, 1810.
? *Seriola semicoronata* Poey, 1860.)

Rather less common than the preceding, and reaching a smaller size.

Color in life pale grayish, silvery below; a gilt band through eye to base of caudal; another through temporal region to front of soft dorsal. No traces of dark cross bands; fins plain.

Body deep, robust, not strongly compressed; mouth larger than in *S. dorsalis*, about as in *S. lalandi*, the maxillary reaching middle of pupil, $2\frac{1}{6}$ in head; lobes of dorsal and anal low, not quite half length of head; nape scarcely carinated.

Head, $3\frac{1}{10}$ in length; depth, 3. D. 1, 32; A. 1, 21; length of specimen described, about 2 feet. Specimens apparently of this species have been obtained by Professor Gilbert at Aspinwall.

The species of this genus are very closely related, and many of those current are very doubtful. Omitting all discussion of those described from farther south, I venture on the following analysis of the species of *Seriola* recorded from the United States. It may be that some of these are really not distinct from others, but at present I think them all valid:

- a. Dorsal and anal fins little elevated, the height of their anterior lobes less than half depth of body.
 - b. Head longer than deep.
 - c. Soft dorsal very long, its rays 36 to 38; maxillary reaching middle of orbit.
 - d. Body deep; depth 3 to $3\frac{1}{2}$ in length; nape carinated; black cross bands permanent. Cape Cod to Cape Hatteras.....ZONATA.
 - dd. Body comparatively slender, its depth $3\frac{2}{3}$ to 4 in length; nape, in adult, rounded; cross bands fading with age. Cape Hatteras to Texas and southward?.....CAROLINENSIS.
 - cc. Soft dorsal shorter, its rays 31 to 36.
 - e. Mouth comparatively large; the maxillary 2 to $2\frac{2}{5}$ in head, reaching about to middle of pupil; nape rounded in adults; cross bands present only in very young.
 - f. Body slender, its depth about 4 in length; head $3\frac{1}{2}$ to $3\frac{3}{4}$ in length; soft dorsal 32 to 34. West Florida to Brazil.....LALANDI.
 - ff. Body comparatively deep, its depth about 3 in length; head $3\frac{1}{10}$; soft dorsal rays 30 to 32. Florida Keys to West Indies and Mediterranean Sea.....DUMERILLI.
 - ee. Mouth smaller; the maxillary $2\frac{3}{5}$ in head, barely reaching front of pupil; body rather slender, the depth 4 in length; soft dorsal rays 34 to 36; caudal fin yellowish. Point Concepcion to Cape San Lucas.DORSALIS.
 - bb. Head deeper than long; body banded at all ages, the bands narrow, arranged in pairs; soft rays of dorsal 30. South Carolina to West IndiesFASCIATA.
- aa. Dorsal and anal fins much elevated, their anterior lobes more than half depth of body; body compressed, the back elevated, the occiput somewhat carinated; soft dorsal rays 29 to 31.
 - g. Body moderately deep; the greatest depth $3\frac{2}{5}$ in length (4 in total); temporal band pale yellowish-brown. West Indies, north to Pensacola.....FALCATA.
 - gg. Body very deep; the greatest depth $3\frac{1}{3}$ in total length; temporal band nearly black. Mediterranean to Buenos Ayres and Florida Keys.....RIVOLIANA.

All the above except *S. fasciata* and *S. rivoliana* have been collected and studied by the writer. These two I have never seen.

71. *Trachynotus carolinus* (L.). *Pompano*.

Not very common; one specimen obtained. As elsewhere, highly valued as a food-fish, but irregular in its appearance.

72. *Trachynotus rhodopus* Gill. *Permit*.

(*Trachynotus rhodopus* et *nasutus* Gill.; *Trachynotus gorcensis* Goode & Bean, not of C. & V.; *Trachynotus carolinus* Poey.)

Not very common; only young ones obtained. These taken with the seine in the surf. This species reaches a larger size than the other American Pompanoes. Its common name, "*Permit*," seems to be a corruption of the common Spanish name "*Palometa*." The drawings made

by Poey of the species called by him *Trachynotus carolinus* have been examined by me. They represent this species. The occurrence of *T. carolinus* in the West Indies seems uncertain.

73. *Trachynotus rhomboides* (Bloch).

Many young specimens taken with the seine in the surf.

Silvery, the very young dusky; soft dorsal tipped with black; ventral spines and anal lobe deep orange; eye pale orange.

The young of *T. rhodopus* are similarly colored. The latter species is, however, at all ages, much more elongate.

74. *Trachynotus glaucus* (Bloch.) *Old Wife*.

One adult specimen taken; not very common.

POMATOMIDÆ.

75. *Pomatomus saltatrix* L. *Blue-fish*.

Not considered common; a few specimens seen; taken in the channels with the hook.

SERRANIDÆ.

76. *Epinephelus* falcatus* (Poey). *Scamp*.

A common food-fish, reaching a smaller size than most of the related species. Held in high esteem as food. Florida specimens (Key West, Pensacola, &c.) are more spotted in color and have the canine teeth more nearly vertical than Cuban examples. In the typical *falcatus* the upper canines are directed strongly forward, the lower correspondingly backward.

77. *Epinephelus microlepis* (Goode & Bean). *Gag*.

Abundant; reaching a weight of 30 to 40 pounds. Universally known as "Gag" at Cedar Keys and Key West. Has this name any connection with the Spanish name Aguaji?

78. *Epinephelus bonaci* (Poey). *Black Grouper*

Equally abundant with the preceding, and reaching a similar size. The young are frequently taken near shore.

79. *Epinephelus venenosus* (L.). *Rock-fish*; *Yellowfin Grouper*.

Two large specimens taken; not abundant; said to reach a weight of over 50 pounds.

80. *Epinephelus itaiara* (Lichenstein). *Jew-fish*; *Guasa*.

One young specimen obtained; a very large one examined. This species reaches a weight of 500 to 700 pounds.

81. *Epinephelus morio* (Cuv. & Val.). *Red Grouper*.

The most abundant of the Serranoid fishes, and, next to *Hæmulon plumieri*, the commonest market fish at Key West. Rarely exceeds 15 pounds. Found in rather deep water.

* As the species of this genus form the subject of a separate paper by Mr. Swain and myself, I refer to them here only briefly, and without discussion of the synonymy.

82. *Epinephelus striatus* (Bloch). *Nassau Grouper*.

Similar to the preceding in size and habits, and not much less abundant. Most seen in the markets are small.

83. *Epinephelus ascensionis* (Osbeck). *Rock Hind*.

Three seen; said to be much superior to the others (except *E. falcatus*) as a food-fish. Most of the species have tough white flesh, which is rather coarse.

84. *Epinephelus guttatus* (L.). (Lacépède). *Coney*.

Three specimens taken; a small fish, rarely exceeding a foot in length. No specimens of the crimson variety (*apiarius*, Poey) were seen at Key West.

85. *Serranus formosus* Linnæus. *Sand-fish*.
(*Diplectrum fasciculare* Auct.)

Rather common; taken in the seine and with the hook. The characteristic division of the preopercle into two clusters of spines is not seen in the young.

Color olive brown above, silvery below, with tinges of golden; sides with narrow horizontal stripes of blue, bright above, pearly whitish below; six of these present, with another at base of dorsal; a broken median stripe before dorsal; stripes on head bright blue; spinous dorsal with two stripes of light blue bordered with darker, and three of light orange-yellow; three blue stripes and four yellow ones on soft dorsal; caudal with light blue reticulations around light orange spots; ventrals and anal bluish white, shaded with light yellowish; pectoral transparent; posterior part of mouth tinged with yellow.

SPARIDÆ.

86. *Lutjanus** *chrysurus* (Bloch). *Yellow-tail Snapper*.

A common food-fish, reaching a weight of 5 or 6 pounds; the adult taken in the channels with the hook, the young with the seine near the shore.

87. *Lutjanus synagris* (L.). *Lone Snapper*.

Still more common than the preceding, reaching a smaller size than any of the other snappers (2 to 3 pounds). The young are very abundant about the shores and wharves.

88. *Lutjanus analis* (Cuv. & Val.). *Mutton-fish*.

Rather less common than either of the preceding, and reaching a larger size (8 to 12 pounds). It is found with *L. chrysurus*.

89. *Lutjanus campechianus* Poey. *Red Snapper*.

Taken in deeper water than the others; shipped in large numbers to the Havana market in live-boats; reaches a weight of 15 to 20 pounds, but the average is not much above 10.

*The genera *Lutjanus*, *Hamulon*, and *Calamus*, being made the subjects of special papers, are only briefly treated here.

90. *Lutjanus caxis* (Bloch & Schneider). *Schoolmaster*.

Rather common, mostly in shallow water; few large specimens seen, and none over 5 pounds in weight.

91. *Lutjanus jocu* (Bloch & Schneider). *Dog Snapper*.

With the preceding and less common. The two are doubtfully distinguished by most fishermen, and the name *Schoolmaster* is often given to either without discrimination.

92. *Lutjanus caballerote* (Bloch & Schneider). *Gray Snapper*; *Mangrove Snapper*.

The most abundant of the snappers and one of the most important food-fish. It rarely exceeds 8 pounds in weight. The young abound everywhere near the shore, and are taken with hooks or with seine. They are particularly numerous in the mangrove bushes which grow in shallow water about the Keys; from this habit comes the name of Mangrove Snapper, which is given to this species in localities much farther north than the mangrove grows.

This species has been wrongly called *Lutjanus caxis* by most recent American writers.

93. *Hæmulon plumieri* (Lacépède). *Common Grunt*; *Sow Grunt*.
(*Hæmulon formosum* Cuv. & Val.)

Very common everywhere; the most abundant food-fish at Key West, the amount consumed in the market exceeding that of all the other "bottom-fish" combined. It reaches a weight of 4 or 5 pounds, but most do not exceed 1 pound. By some fishermen it is thought to be the female of the yellow grunt, and is therefore called by them "Sow Grunt," the other being known as "Boar Grunt."

94. *Hæmulon sciurus* Shaw. *Yellow Grunt*.
Hæmulon elegans (Cuv. & Val.)

Rather common, the young taken about the shores, the adult in deeper water, with the preceding.

95. *Hæmulon gibbosum* (Bloch & Schneider.) *Margate-fish*.

In deeper water; not very common. Much the largest of the Grunts, reaching a weight of 10 or 12 pounds. The name "*Margate-fish*" is very old; I cannot guess its origin. "*Maggot-fish*," a name given by Schöpf, is evidently the same.

96. *Hæmulon parræ* (Desmarest.) *Sailor's Choice*.

Common; the young very abundant along the shores.

97. *Hæmulon flavolineatum* (Desmarest.) *French Grunt*; *Open-mouth Grunt*.
(*Hæmulon heterodon* Cuv. & Val.)

Not common; but one specimen taken.

98. *Hæmulon aurolineatum* (Cuv. & Val.). *Tom-tate*.
(*Hæmulon chrysopteron* Cuv. & Val.)

Rather common; the young very abundant along the shore, and taken readily with hook and line. This species rarely exceeds a pound in weight.

99. *Hæmulon tæniatum* Poey.

Not very common; taken with the seine along the shore. The smallest species rarely exceeding 6 inches in length.

100. *Pomadasys virginicus* (L.). *Pork-fish*.

A common food-fish, taken with hook and line. It reaches a weight of about 2 pounds.

Oblique bar from nape through eye, and vertical bar downward from dorsal jet black; space before the anterior bar deep yellow; interspace between bars pearly gray, with yellow spots, the spots confluent above into a yellow area; ground color of body plain pearly gray with about seven deep yellow longitudinal stripes; the pearly interspaces not edged with darker and not distinctly blue; all the fins deep yellow; iris gilt gray.

A very young specimen showed the following coloration in life: Pale; anterior region from lower jaw and temporal region to spinous dorsal bright yellow; spinous dorsal, ventrals, and front of anal deep golden; other fins pale; a large round jet-black spot at base of caudal; a dark band from front of spinous dorsal downward, and two black stripes along sides, one from nape to last ray of dorsal and one from the eye nearly to the caudal spot.

101. *Pomadasys chrysopterus* (L.). *Whiting*.

(*Labrus fulvomaculatus* Mitchill; *Pristipoma fasciatum* Cuv & Val. *Orthopristis poeyi* Seudler.)

Not very common; apparently identical with specimens from Cuba, and with others from Cedar Key and other more northern localities.

Color in life light bluish-gray, everywhere with iridescent reflections; sides with faint darker cross bars, which are scarcely visible; head grayish-blue; a small golden spot at point of junction of scales all over sides of body, these arranged in undulating rows which become straight on caudal peduncle only, where also they are somewhat confluent; fine spots on top of head, larger spots on sides of head, two of them before eye becoming oblique stripes; dorsal bluish-gray, with spots everywhere of bronze-brown; caudal bluish, its scaly portion with fine bronze spots; ventrals and anal whitish, the former dusky at tip; pectorals colorless; mouth yellow within.

102. *Calamus pennatula* Guichenot. *Little-head Porgy*.

A common food-fish, taken with hook and line in the channels. Grows to be little more than a foot in length.

103. *Calamus calamus* (Cuv. & Val.). *Saucer-eye Porgy*.

With the preceding; scarcely less common.

104. *Calamus bajonado* (Bloch & Schneider). *Jolt-head Porgy*.

One of the common food-fishes, more abundant than either of the preceding, and reaching a much larger size. Grows to a length of 2 feet. All are alike considered as food-fishes of fair quality.

105. *Calamus penna* Cuv. & Val. *Sheep's-head Porgy*; *Little-mouth Porgy*.
(*Calamus milneri* Goode & Bean).

The young very common, taken with seine along the shores; only a single adult specimen obtained.

106. *Calamus arctifrons* Goode & Bean. *Grass Porgy*; *Shud Porgy*.

Common, with the preceding; the adult often taken in the channels. The smallest of our species of *Calamus*.

107. *Diplodus probatocephalus* (Walbaum) *Sheep's-head*.

Rather rare; a few specimens seen.

108. *Diplodus unimaculatus* (Bloch.) *Bream*.
(*Sargus caribaens* Poey.)

A few specimens 6 to 8 inches in length, taken with the seine along the shore. These are identical with specimens obtained in Cuba.

Bluish silvery in life, with faint traces of six dark vertical bars, the second of these forming a rather conspicuous dark humeral spot. Below the lateral line six horizontal golden stripes, narrower than the interspaces; about four stripes above the lateral line, these more broken and irregular, especially anteriorly; gilt shades on cheek and nape; dorsal plain, its edge dusky; pectoral and caudal plain light yellow; ventral reddish-orange (dusky in some specimens—males, according to Poey), anal slightly yellowish.

This species is closely related to *D. rhomboides*, having, like the latter, emarginate incisors. Its coloration is darker and more golden than that of *D. rhomboides*, its body is deeper; the dorsal spines are constantly thirteen instead of twelve, and the second anal spine is longer than in *D. rhomboides*, its tip extending when depressed beyond the tip of the third spine.

109. *Diplodus rhomboides* (Linnaeus). *Bream*.

With the preceding, rather more common, but far less abundant than farther north.

Olivaceous, the sides bluish-silvery; a humeral spot and traces of six vertical bars; gilt stripes much less intense than in *D. unimaculatus*, much broader than the interspaces; about seven stripes below the lateral line, those above it more or less confluent; dorsal fin pale-bluish, with a submedian gilt band and a gilt edging; caudal yellow, faintly barred; anal bluish, with a median yellowish band; ventrals mesially yellowish; pectorals plain.

110. *Cyphosus bosqui* (Lacépède.) *Chub*.

A valued food-fish. Not very common, but one specimen being obtained—an unusually large one for this species.

Color in life steel-gray, very slightly bluish, not much paler below; the edges of each row of scales on back and sides slightly brassy, so that very faint yellowish stripes alternate with bluish ones of about equal width; diffuse pale stripe below eye, a yellowish one above and

below this; fins all dull grayish; ventrals and anal somewhat blackish; edge of opercle slightly darker.

MULLIDÆ.

111. *Upeneus balteatus* Cuv. & Val. *Goat-fish*.
(*Upeneus flavorittatus* Poey.)

A single, nearly adult, specimen taken in the seine. It agrees fully with others from Havana.

Color in life flesh-color above, sides silvery, tinged with yellowish below (entire body becoming crimson on immersion in spirits); edges of scales of back light olive-green; top of head quite rosy; a bright yellow band from eye to base of caudal, about as wide as pupil and a little above axis of body; a whitish streak above and below this; another above lateral line; a yellow stripe along snout; yellow shades below eye; barbels flesh-color; both dorsals and caudal bright yellow; ventrals and anal pale yellow; pectoral flesh-color; anterior and posterior edges of opercle edged with yellow; iris red.

This species belongs to the subgenus *Mulloides*, having the teeth bluntish, strong, in several series.

112. *Upeneus maculatus* (Bloch.) *Goat-fish*.

Numerous young specimens taken with the seine in the surf.

Color, olive above, pearly below, the sides faintly yellowish and everywhere more or less flushed with pale red (body becoming crimson on immersion in spirits); the red shades generally more distinct after death; scales above considerably tinged with red, their edges greenish; some three to five obscure dark blotches on sides along lateral line; one under each dorsal fin more distinct than the rest and about as large as eye; a bright greenish spot on each scale of the row above lateral line on the middle of back, these forming a short series; three narrow stripes of light greenish from eye forward and two backward, the lower passing under the eye and merging into the lower anterior stripe; snout reddish; barbels orange, yellow at tip; dorsal mottled with orange-brown, its tip yellowish; soft dorsal pale-yellowish, with two black blotches; caudal pale at base, then yellowish, the tips of the lobes pale orange; anal pale reddish; ventrals light reddish, mesially blackish.

SCIÆNIDÆ.

113. *Menticirrus saxatilis* (Bloch & Schneider).
(*Menticirrus nebulosus* (Mitchill).)

Numerous young specimens taken with a seine in the surf. These are evidently identical with a fish taken at Pensacola in 1881 by Jordan & Stearns, and referred to *Menticirrus nebulosus*. These are darker in color than specimens from the North, but in other respects I am unable

to see that they differ at all from the common "king-fish" of the North, to which species we therefore refer them.

Color in life, of largest specimen (about 4 inches long), gray, tinged with bronze and profusely dotted with black; a band of dark olive between eyes; two downward and backward at nape below dorsal; a broad dark band downward and forward from last dorsal spines to ventrals, involving last half of spinous dorsal. Two stripes downward and forward from soft dorsal, one forming a black spot on the middle of the fin; a horizontal band of similar color on posterior part of body, extending along lower lobe of caudal; ventrals and base of anal black; other fins pale except on the black areas; inside of opercle whitish, with blackish dots.

Smaller specimens are more nearly uniform bronze-black.

The scarcity of Sciaenoid fishes is one of the most remarkable peculiarities of the fauna of the Florida keys and Cuba. The family is well represented along the coasts of the mainland. These fishes apparently prefer sandy shores to coral formations.

GERRIDÆ.

114. *Gerres lefroyi* (Goode).

Not rare in the surf. A considerable school taken at one time with the seine. One of the smaller species, rarely exceeding six inches.

115. *Gerres gracilis* (Gill).

(*Eucinostomus pseudogula* Poey.

Eucinostomus harengulus Goode & Bean).

Rather common in shallow waters. There is no doubt of the identity of Floridan and Cuban specimens. I see no difference between either and the *Gerres gracilis* of the Pacific coast.

116. *Gerres gula* Cuv. & Val. Common "Shad."

(*Diapterus homonymus* Goode & Bean;

Eucinostomus argenteus Baird & Girard;

Eucinostomus gulula Poey.)

Excessively common everywhere in shallow water. It reaches a length of four or five inches, and is used only for bait. In common with all the other species of the genus, this is known as the "shad."

117. *Gerres cinereus* (Walbaum). Broad Shad.

Gerres zebra, Muller & Troschel.

Gerres aprion Cuv. & Val.

Rather common, taken with the seine in water of moderate depth, in company with species of *Mugil*. It reaches a length of about 15 inches, being the largest species of the genus. It is a food-fish of some importance at Key West.

Color in life, silvery, olivaceous above, sides with faint darker cross bars, most distinct in life; spinous dorsal and ventrals partly golden. Eye white.

118. *Gerres olisthostoma* Goode & Bean.

A single large specimen taken with hook and line from the wharf.

EPHIPPIDÆ.

119. *Chætodipterus faber* (Broussonet).

Apparently not common; a single young specimen obtained.

CHÆTODONTIDÆ.

120. *Pomacanthus aureus* (Bloch). *Black Angel*.

Rather common; frequently taken with spear or hook, not valued as a food-fish.

Adult specimens are grayish without tinge of yellow; the center of each scale blackish, the edge pearly gray. Head and vertical fins dusky gray, their tips blackish; a narrow yellowish bar near tip of caudal, followed by a dark streak; the tip of the fin whitish. Pectoral yellowish, especially its inner side and its basal half, its tip translucent. Lower jaw pale flesh-color. Ventrals brown, yellowish at tip.

Younger specimens have a whitish cross-bar on the anterior part of body, behind which are sometimes still others.

There is no doubt of the distinctness of this species from *P. arcuatus*, as has already been shown by Bleeker, Poey, and Lütken. *P. arcuatus* has ten dorsal spines, smaller scales and yellow cross-bands, and is as yet unknown from the coast of the United States.

121. *Holacanthus ciliaris* (Linnaeus). *Yellow Angel*.

Rather common, the young abundant among the rocks; the adult often taken with the spear. Not much valued as a food-fish, probably because of some prejudice, as the flesh is said to be very good.

Color in life, yellowish brown on sides, each scale with a darker or orange spot. Back above, shaded with violet, which grows brighter above and merges into intense sky-blue along the edges of the spinous dorsal and on the region before the dorsal; scales of dorsal region with brown spots like those on the sides. Head paler, the upper lip yellowish; lower jaw reddish. Spines of preopercle and edge of opercle very bright sky-blue. Iris yellow, marked above and below by blue. Top of head bluish green. Breast sky-blue, paler anteriorly, the color fading before the vent. Pectoral sky-blue at base, then broadly golden, its edge pale; axil and inner side of pectoral golden. Ventrals golden. Blue margin of dorsal edged below by dull orange, its posterior edge and produced lobe golden yellow. Caudal colored like body, its edge broadly golden-yellow. Anal colored like soft dorsal. Traces of a brownish spot, surrounded with blue at the nape.

There seems to be no sufficient reason for setting aside the name *ciliaris* for this species in favor of the later *parrae* of Bloch. It is true that Linnaeus confounded other species with his *ciliaris*, but the species which he seems especially to have had in mind is apparently the present one.

ACANTHURIDÆ.

122. *Acanthurus chirurgus* (Bloch). *Taug.*

Common, the young taken with the seine along the shore; the adult with the hook in the channels.

Adult olive-brown, more or less distinctly greenish; middle of sides paler; breast tinged with blue; sides with about twelve distinct blackish vertical bars, rather narrower than the interspaces, most distinct over front of anal; a bronze-olive stripe along base of dorsal; head olive, slightly tinged with blue on the preorbital; lips light bluish; edge of opercle dusky; four or five yellowish streaks extending across eye, obliquely upward and backward; region at base of caudal spine blue-black, the black surrounded by a sky-blue ring; a pale olive ring around base of caudal.

Spinous dorsal with alternate stripes running upward and backward, of dark blue and bronze-olive, the two colors of about equal width. Soft dorsal with a bluish streak on the front side of each ray and a bronze stripe behind it, the fin sometimes showing horizontal bluish streaks; anal similarly marked; edge of dorsal and anal narrowly sky-blue; caudal dark, tinged with blue; anal and ventral similar. Pectoral blue above, its median region washed with olive.

123. *Acanthurus tractus* Poey.

Several young specimens taken, apparently of this species. In life, olivaceous, with longitudinal reticulating lines of darker olive, very close set; stripes on fins nearly horizontal, distinct and parallel, similar and continuous on both the spines and the soft rays; caudal fin dull yellow-olive, the pale ring at its base faint; edge of opercle black. The caudal fin in these is much more deeply lunate than in either young or adult of *A. chirurgus*, the depth of the emargination in both species increasing with age.

124. *Acanthurus cœruleus* (Bloch). *Blue Taug.*

(*Acanthurus brevis* Poey).

A single young specimen apparently corresponding to the *Acanthurus brevis* of Poey, obtained. "Blue Tangs" are occasionally taken, according to the fishermen.

Color light olive, with narrow, horizontal, wavy streaks of darker olive, slightly tinged with bronze, these rather conspicuous and very numerous. Belly livid bluish; a whitish ring at base of caudal; edge of opercle blackish; a faint blue stripe and some orange before eye. Both dorsals pale bright orange, with six stripes of light slaty-blue, continuous and horizontal on both parts of the fin; edge of dorsal light blue, its base orange; caudal dull yellow with a whitish edge. Anal marked like dorsal, but the bluish darker and the pale color dull yellowish-brown, the edge of the fin dusky. Ventrals violet, blackish at tip. Pectoral light yellow; caudal spine yellow.

This differs from adult specimens from Cuba only in the ground color,

which probably changes gradually to blue with age. The adult of *cæruleus* is washed everywhere on body with clear bright violet-blue, very bright on the pale streaks and markings on body and fins. Fins largely bronze-brown; caudal mesially light yellowish.

POMACENTRIDÆ.

125. *Pomacentrus leucostictus* Müller & Troschel.

About rocks and reefs in clear, rather deep water; not rare.

Color in life, dark olive-brown anteriorly, clear yellow, with pearly reflections on sides and below; the caudal peduncle and fin rich golden-yellow. Head olive above, golden below, the colors changing insensibly. Head with numerous spots of dark blue, closer set above; those before eye and on snout oblong, stripe-like. These spots appear black in life, but in spirits they become intense sky-blue, and ultimately fade to whitish. Each scale of back above lateral line anteriorly with a vertically oblong stripe of dark blue. Behind and below these, many scales have each a round point of deep violet. One row of these on upper edge of caudal peduncle on each side, and three partial series below lateral line. Dorsal bluish-black, each scale with a blue point. Last rays of soft dorsal yellow; a black point at base of last ray. A large blackish blotch on middle of first soft rays. Spinous dorsal with a marginal pale band made of two narrow stripes of bluish, and two of dull orange. Anal golden yellow, its edge dusky, traces of a pale spot at base of last ray. Pectoral yellow, a conspicuous blue spot at base above. Ventrals yellow, tinged with bluish. A blackish blotch on middle of base of lower jaw.

126. *Pomacentrus obscuratus* Poey.

(? *Pomacentrus atrocyaneus* Poey).

Not rare; in the same localities as the preceding.

Males sooty blue-black in life, not paler below; each scale of back and sides with an inconspicuous bronze-olive spot. A faint paler band around caudal peduncle. Head with small spots of sky-blue, those before eye oblong. Iris blue and gilt. Spinous dorsal with blue and with bronze spots. Soft dorsal with fine blue points. Dorsal with a submarginal band of paler; this band on spinous dorsal formed of two oblique yellowish stripes with a bluish stripe between them. Caudal black, paler at tip, its base with blue spots. Anal black, with blue points at base. A whitish spot at base of last ray. A conspicuous black spot at base of upper pectoral rays. No black blotch on back of tail. Other specimens (females?) are paler, with faint blue spots on scales of sides, and no blue spots on head or pale spot on anal.

Body rather deep, the anterior profile much convex; interorbital space strongly convex; eye longer than snout, $3\frac{1}{2}$ in head. Preorbital and preopercle sharply serrate. Caudal well forked, the upper lobe the longer, especially in males. Lower limb of preopercle scaly. Head $3\frac{1}{3}$;

depth 2 ($2\frac{2}{5}$ in total), D. XII, 14; A. II, 12; Scales 3—28—10. Length 4 inches.

This species is apparently closely related to *P. fuscus* Castelnau and to *P. atrocyaneus* Poey; the latter species is said to have the depth 3 in total length, while the former is described as having the preorbital and preopercle weakly serrate, and a black blotch on the back of the tail.

127. *Glyphidodon saxatilis* (L). *Cock-eyed Pilot*.

Common about rocks and in tide-pools.

LABRIDÆ.

128. *Lachnolæmus suillus* Cuvier. *Hog-fish*.

(*Lachnolæmus falcatus* Cuv. & Val., not *Labrus falcatus* L.)

A common food-fish, reaching a weight of six or eight pounds. The flesh is white and considered good, although less valued at Key West than in some other regions.

The variations in the ground color are considerable, older fishes and fishes taken in deep water being much redder than small fishes or fishes taken from grassy bottoms. One of the latter, one foot in length, was gray, violaceous above, each scale olive-green at base. Lower parts tinged with creamy-orange. Head more purplish, mottled with olive. Cheeks greenish. An undulate blue line below eye, below which are purplish reticulations. Long spines of the dorsal fin greenish at base, orange at tip. Soft dorsal similar, a large black blotch at its base. Caudal grayish, with three rows of dull olive spots. Anal similarly colored; pectoral light orange. Ventrals blackish at tip, reddish at base.

Deep-water fishes are brick-red or orange red, the degree of redness being very variable, the markings constant. The adult male has further the vertical fins all blackish at base, the black forming a crescent on the caudal; frontal region from snout to occiput abruptly blackish; lower jaw light yellow. The male fish has the cleft of the mouth very much wider than the female. These large-mouthed hog-fish are thought by many fishermen to belong to a different species. One specimen had four elongate spines in the dorsal.

We have little doubt that Professor Poey is right in referring all the nominal species of *Lachnolæmus* to one, and in retaining for this one the name *L. suillus* of Cuvier, instead of that of *falcatus* L., used by Valenciennes.

The *Labrus falcatus* L. is described as follows:

“Falcatus, 10. L. prima dorsali analique radiis quinque primis inermibus falcata. D. $\frac{5}{7}$; P. 17; V. 5; A. $\frac{3}{5}$; C. 20.

“Habitat: In America. Mus. De Geer. Corpus latitudine *Brama*, *argenteum*. Radius primi e mollibus dorsalis analisque elongati, sequentibus, unde hæ pinnæ falcatæ, dentes acuti. Pinnæ ventrales parvæ.”

I see no reason for thinking this a *Lachnolæmus* at all. It is much more likely to have been a *Trachynotus*. So far as it goes, it agrees fully with *Trachynotus rhodopus*.

129. *PlatyGLOSSUS radiatus* (Linnaeus). *Pudding-wife*.

(*Labrus radiatus* L., Syst. Nat. ed. x, 1758, 288 (based on a figure by Catesby; not *Sparus radiatus*, L. ed. xii.)

PlatyGLOSSUS cyanostigma, (Günther, iv, 161.)

Rather common, reaching a much larger size than any other of the American *PlatyGLOSSI*, and therefore a food-fish of some importance. The largest seen are about 20 inches in length.

This is the species which should retain the Linnæan name *radiatus*. The *Labrus radiatus* of the tenth edition of the Systema Naturæ, based on a figure of Catesby, is this fish. The *Sparus radiatus* of the twelfth edition, described from a specimen sent by Dr. Garden from Charleston, is *PlatyGLOSSUS bivittatus*.

In life the female of the "*Pudding-wife*" is of a rich translucent bronze olive, the belly becoming of a livid pearly blue, tinged with creamy orange. A quadrate area before dorsal yellowish green, with abrupt edges and bounded by blue lines; three whitish saddle-like blotches below dorsal fin; a yellowish area on back of tail; top of head orange olive, with three rows of clear blue spots; a blue stripe from nape through upper part of eye to snout; a wavy stripe of blue just below eye; temporal region with curved streaks of bright blue; lips mostly blue; cheeks nearly plain; opercle light orange, with dashes of blue and violet, but without well defined spots; middle of lower jaw light blue; a longitudinal streak on lower part of cheeks; lower jaw light orange, with two blue cross-bands; interopercle with a blue stripe; axil green; a yellowish green shade from pectoral to caudal; a deep blue spot at upper base of pectoral; two broad orange bars downward and backward from pectoral, the interspaces blue; each scale on body with vertical spot of a vivid blue; on caudal peduncle these spots are brighter, becoming round below and horizontally oblong above; some of them on base of anal confluent in lines; mouth and gill-cavity within white (livid blue in male).

Dorsal orange; a broad blue marginal stripe; a blue stripe at its base, interrupted behind; besides these a mesial stripe, breaking up posteriorly into about three rows of irregular curved spots. Caudal orange, broadly tipped with yellow, its outer rays blue, its basal part with many irregular spots of light blue. Anal with a basal row of blue spots, then an orange band, then a narrower stripe of bright blue, then a broad yellow band, then a row of blue spots, then orange, then an edge of sky blue. Pectoral translucent, shaded with blue and some pale orange. Ventral with the spine and first soft ray blue, the membrane orange, the fin otherwise translucent.

Male fish largely olive, the lower parts deep bluish green; a bright orange olive area behind opercle, then a blue cross band with indefinite

edges at vent, the rest of the body tinged with golden, the part above axis of body more or less orange brown; the whole upper half of body shows more or less orange shading. Breast blue-green. Blue spots on scales less pronounced than in the female. Head livid blue-green, more or less striped and spotted with clear blue, the spots arranged as in the females, but less sharply defined. Orange stripes and areas on top and front of head as in female, but the blue areas larger and more encroaching.

Dorsal and caudal alike in both sexes, the blue more pronounced in male. Anal alike in both, but in the male the median stripe is of a rich grass green. Pectoral in male with blue rays and bright grass-green membranes. Ventrals similar, but the inner rays green. Blue spot at base of pectoral above very intense. Oblique bands from pectoral downward and backward similar in both sexes. Blue under lower jaw and middle of breast similar.

Lower pharyngeal T-shaped, not much broader than long.

130. *Platyglossus bivittatus* (Bloch). *Slippery Dick*.

(*Sparus radiatus* Linnæus, Syst. Nat. ed. xii, 1766, 472, on a specimen sent from Charleston by Garden.)

(*Platyglossus humeralis*, *grandisquamis* and *floralis* of authors.)

Exceedingly common in shallow waters and about rocks. It rarely reaches the length of a foot. Its markings are quite constant, but the ground color is subject to much variation. All the specimens obtained in Cuba are light olive, much paler than any taken at Key West, but the markings are precisely the same. The changes due to age are considerable. This fish is often caught by boys with small hooks. It is known as *Slippery Dick*. With *Synodus spixianus*, it is also often called *Soap-fish*. It is not brought into the markets.

Greenish above, sides shaded with purple, the purplish color extending on the back where it forms about ten dark bars. Young specimens with a brownish lateral band and a reddish stripe above it and below it.

Many scales of posterior part of body, each with a vertical spot of deep greenish blue; these smallest and bluest on caudal peduncle. Blue, red, and greenish shades extending downward and backward from pectoral. A red band from each eye, these meeting on the nape; each bordered before with blue, behind confluent with a median reddish vertebral stripe which extends to front of dorsal. Snout largely red; frontal region green; a red band through snout to edge of opercle edged by blue below, then yellowish and again red. Lower jaw with two orange red bands, its middle red in front, blue behind. Throat reddish. Opercle with a violet spot edged by green and orange. Beyond this is a <-shaped violet mark edged behind with yellow. Dorsal bluish at base, then red, yellowish, red, and pale. Sometimes, but not always, a violet spot at base of its last ray. Caudal largely red, with oblique bluish and yellowish stripes, the corners more or less bluish, darkest in the adult; anal like dorsal. Ventrals redish; pectorals plain.

131. *Xyrichtys rosipes* Jor. & Gilb.

Two young specimens taken with the seine in the surf.

132. *Doratonotus thalassinus* Jor. & Gilb.

One specimen taken with the seine in eel-grass. The most exquisitely colored fish seen at Key West.

133. *Scarus guacamaia* Cuvier. *Parrot-fish*.

Rather common in rocky places. It reaches a length of 15 to 18 inches, being larger than any of the other species.

134. *Scarus cœruleus* Bloch.

One young specimen taken; adult specimens, deep blue in color, are said to be frequently taken, but none were seen by me.

135. *Scarus croicensis* (Bloch).

(*Pseudoscarus sanctæ-crucis* Gthr.)

A few young specimens taken.

136. *Scarus flavescens* (Bloch & Schneider.)

(*Scarus squalidus* Poey.)

The most abundant species of the genus; found everywhere in eel-grass and algæ. It rarely exceeds 10 inches in length. Like the other members of the genus, it feeds on algæ, and from the softness of its flesh it is rarely brought into the markets, although it has not a bad flavor.

137. *Sparisoma cyanolene* Jordan & Swain.

Common with the preceding, but smaller in size, the largest, sexually mature, rarely exceeding 6 inches.

138. *Sparisoma xystrodon* Jordan & Swain.

Common with the preceding, and still smaller, the females with spawn at a length of 4 inches.

139. *Cryptotomus beryllius* Jordan & Swain.

Not rare in eel-grass. It reaches a length of about 10 inches.

SCORPÆNIDÆ.

140. *Scorpæna plumieri* (Bloch).

Scorpæna bufo Cuv. & Val.

Scorpæna rascacio Poey.

Rather common; the young taken with the seine near the shore; the adult taken with the hook in deeper waters. The species is held in great dread in common with the other species of the genus and *Batrachus tau*, by the fishermen on account of the poisonous properties of the dorsal spines. It is rarely used for food.

The coloration is highly variegated, and is subject to much variation. The species may be always known by the presence of large white spots in the jet-black ground color of the axil.

In life sand color, with two broad blackish shades on the body and one on the head; the belly purplish; the lower side of head finely speckled in all shades of light, dark, and pearly-bluish; upper parts covered with whitish cirri and profusely speckled, the surface looking as though covered with sand; eye with radiating dark spots; dorsal colored like body, with some well-marked whitish spots; second dorsal encroached on by the dark band on the body below it; caudal variously mottled, with three black and three pale bands; anal whitish, variegated with reddish and black; ventral similar, but with more maroon-red; pectoral still more variegated, the tip scarlet shaded; inside of pectoral largely bright yellow, then blackish, tinged with cherry-red; axil jet black, with large round white spots; lips barred with black and whitish; membranes and angle of mouth light bright yellow.

Some specimens, especially old ones, taken in red algæ, are largely scarlet on body and fins.

141. *Scorpæna stearnsi* Goode & Bean.

Numerous young specimens taken with the seine in eel grass. Olive above, bluish below, considerably mottled, and with pale dermal flaps, which give the body a sanded appearance. Two faint dark shades on body; vertical fins all dotted with white; anal with same, dusky; caudal tipped with dark, and with a dark median band; some red on all the fins; ventrals red, tipped with blackish; pectoral much mottled, yellowish within; axil whitish, with numerous dark reddish-brown spots; cirri long, grayish, and mottled.

142. *Scorpæna grandicornis* (Cuv. & Val.).

Young specimens rather common in the eel-grass; no large ones seen.

In life gray, with faint cross shades of brown; numerous sulphur yellow spots scattered about on sides; sides with white dots; axil dark gray, with round white dots, each surrounded by a dark ring; pectoral with three blackish blotches above and one toward the base below, tinged with sulphur-yellow, especially on the inner side; supraocular filament very large ($1\frac{2}{3}$ in head), blackish, with gray fringes; spinous dorsal largely black; soft dorsal edged with dusky; anal with three black bands; caudal with two, besides a faint one at base; ventrals tipped with black.

Body rather deeper than in *S. plumieri*, its coloration less variegated; head and sides of body with dermal flaps; a slight depression below eye; occipital pit very deep; spines of head sharp; a few scales on opercle; breast with rudimentary scales; supraocular flap very long, broad, and fringed, more than half length of head, reaching to beyond front of dorsal; maxillary reaching posterior margin of eye, $2\frac{1}{3}$ in head; dorsal spines higher than in related species, the highest as long as the long second anal spine, and about half head.

Head, $2\frac{1}{2}$; depth, $2\frac{1}{4}$; D. XII, 9; A. III, 5; Lat. 1. with about 26 pores.

This common West Indian species has not been previously noticed on our coasts.

The four species of *Scorpana* found on the Florida coast are readily distinguished by the colors of the pectoral axil, as follows :

Plumieri: Axil jet black, with a few large white spots.

Grandicornis: Axil dusky gray, with numerous white stellate spots.

Stearnsi: Axil pale, with several round blackish spots.

Calcarata: Axil pale, with dark specks and a black spot above.

URANOSCOPIDÆ.

143. *Astroscopus anoplus* (Cuv. & Val.).

Two young specimens, each rather less than 2 inches in length, taken with the seine in eel-grass.

Color very dark olive, becoming jet black in spirits on upper part of body, lower jaw, and spinous dorsal. Belly and fins otherwise abruptly whitish; no pale spots anywhere.

Head very large, about as broad as deep; its upper surface rugose and entirely bony, except a small area along base of premaxillary in front. No naked areas behind or between the eyes. A transverse depression behind the eyes and before the occipital ridges; these ridges rather prominent, obtuse; a similar ridge (turbinal) above opercle, ending in a short, bluntish spine, which does not project beyond the opercle.

Humeral spine scarcely developed. Preopercle with two large bluntish spinous projections, the posterior largest, directed downwards and backwards, the other downwards and forwards. No spine on subopercle. No distinct spine on pelvis before ventrals. Cheeks covered by smooth skin, the preorbital forming a narrow bony ridge parallel with the maxillary. Suborbital very narrow; teeth rather strong; lips fringed. No intralabial filament. Maxillary reaching to below posterior part of eye. Scales very minute, scarcely appreciable even with the lens; traces of scales appearing only on the upper part of the sides. Caudal nearly as long as pectoral, $1\frac{1}{4}$ in head; head $2\frac{1}{2}$ in length; depth, $3\frac{1}{4}$. D. IV, 14; A. 13.

It is evident that these specimens belong to the species originally called *Uranoscopus anoplus*, by Cuv. & Val., and that it is specifically, if not generically, different from the fish which has been called *Astroscopus anoplus* by recent American writers.

In the complete armature of the top of the head this species agrees with *Uranoscopus*, while in most respects it approaches more nearly to the type of *y-græcum*, the genus or subgenus *Upsilonphorus*.

I have not the materials at hand for a general revision of the synonymy of these fishes.

At present, it would appear that three species are represented on our Atlantic coast, viz :

1. *ASTROSCOPUS ANOPLUS* (Cuv. & Val.).

Charleston; Key West.

2. UPSILONPHORUS GUTTATUS (Abbott).

(*Astroscopus anoplus* Bean, Proc. U. S. Nat. Mus., 1879, 60.)

3. UPSILONPHORUS Y-GRÆCUM (Cuv. & Val.).

Astroscopus y-græcum Bean., Proc. U. S. Nat. Mus., 1879, 61.

Astroscopus anoplus Jor. & Gilb., Proc. U. S. Nat. Mus., 1882, 289 (Pensacola, young).

Astroscopus y-græcum Jor. & Gilb., Proc. U. S. Nat. Mus., 1882, 610 (Charleston, adult).

The comparison between *A. anoplus* and *A. y-græcum* by Jordan & Gilbert, l. c., 289, is valueless, as the specimens examined were respectively the young and the adult of *y-græcum*. According to Dr. Bean, *Astroscopus guttatus*, of which he has examined both young and old, is distinct from *y-græcum*. The adoption of the name *anoplus* instead of *guttatus* is, as we have seen, improper.

Both *Upsilonphorus* and *Astroscopus* are defined with perfect correctness by Gill (Proc. Acad. Nat. Sci. Phila., 1861, 113), except for the statement that in the latter the body is naked.

LEPTOSCOPIDÆ.

144. *Dactyloscopus tridigitatus* Gill.

Three specimens taken with the seine in the surf, on sandy bottom.

Pale sand color above, the lower parts whitish; above 12 narrow cross-bands of whitish on the back, not extending down far on the sides; head mottled above; fins all pale.

The pseudobranchiæ in this species are small, but evident. There is, therefore, no real difference between *Dactylagnus*, which has pseudobranchiæ, and *Dactyloscopus*, of which this is the typical species, and in which they were said to be wanting.

GOBIIDÆ.

145. *Gobius soporator* Cuv. & Val. *Rock-fish*.

(*Gobius mapo* Poey.)

Very abundant everywhere in the tide-pools and shallow waters.

146. *Gobius stigmaturus* Goode & Bean.

Two specimens taken with the seine in a shallow bay.

Very pale olive, everywhere freckled and spotty; lower part of sides silvery, crossed by faint and narrow cross streaks of light brown; sides with about five faint dark blotches; a dark blotch below eye and one on opercle; a round black spot at base of caudal; bars on vertical fins light olive.

Numerous other specimens are less freckled in coloration, and have a more diffuse caudal spot as well as a vague dark spot at the shoulder. The dusky marks on the sides are larger. I cannot find any other differences, and refer all of them to *G. stigmaturus*. The relations of *G. boleosoma*, *G. stigmaturus*, and *G. encaemus* are certainly very intimate.

147. *Gobius encæomus* Jor. & Gilb.

One small specimen taken with the seine in a shallow bay.

Light green, with five diffuse spots of darker green on sides, the posterior one most conspicuous; pectorals, both dorsals, and caudal edged above with pale orange; ventrals mostly black, edged with paler; anal dark; a conspicuous dusky shoulder-spot; maxillary reaching to below middle of eye; caudal about half longer than head. Lat. l. about 30.

This little specimen appears to be identical with that described by us from Charleston under the name of *Gobius encæomus*. The species is allied to *G. stigmaturus*, but has a much slenderer body. The number of scales in a lateral series is less than 37, the number originally stated by us. There are about 33 in this specimen.

148. *Gobiosoma bosci* (Lacépède).

One specimen taken with the seine in a shallow bay.

Pale olive with darker cross bands formed of dark dots; a row of dark dots along middle of side; vertical fins all mottled and faintly barred with dark olive; pectorals and ventrals nearly plain.

149. *Gobiosoma ceuthœcum* Jor. & Gilb.

One specimen found in the cavity of a sponge.

150. *Eleotris smaragdus* Cuv. & Val.

(*Erotelis valenciennesi* Poey.)

Two specimens taken with the seine among algæ.

Color in life very dark olive, almost black, the coloration formed by dark points, which are especially numerous on head and breast.

First dorsal olive and black; second, dusky olive, with about four horizontal blackish streaks; caudal blackish; anal olive, soiled with dark points; ventrals pale, with dark points; belly livid; pectorals light orange, with blackish points at base; some dark points behind eye.

Cuban specimens are rather paler in color, but are not otherwise different.

Head, $5\frac{1}{2}$ in length; depth, 10 to 12. D. VI-1, 10; A. 1, 9; Lat. l. about 100.

This species differs very strikingly from *Eleotris gyrinus* in the extreme slenderness of its body. It is also strictly a marine species. On account of these peculiarities Professor Poey has made it the type of a distinct genus, *Erotelis*.

BLENNIIDÆ.

151. *Cremnobates marmoratus* Steindachner.

Rather common; several specimens taken with the seine in eel-grass.

Color in life of varying shades of olive-gray or sand color, with a series of whitish blotches on head and along sides; markings on dorsal and

anal whitish; two dark blue ocelli on dorsal and one on anal, these edged with orange and interiorly with black; ventrals, pectorals, and caudal whitish, barred with clear orange-red; first dorsal black at tip; a curved blackish line at base of caudal; lower side of head yellowish-brown, with whitish bands.

152. *Cremnobates fasciatus* Steindachner.

With the preceding; smaller and less abundant.

In life light pinkish-brown, much mottled, and with traces of six to eight faint darker bars; head and its cirri above whitish; three blackish spots behind eye, radiating from it, the lower one largest; preopercle with three dark dots; dorsal pale, with nine blackish blotches, in the next to the last of which is a large blue-black ocellus, edged with orange; anal with five dark blotches and no ocellus; a blackish bar across base of caudal; rest of caudal and pale part of anal with dark dots; ventrals whitish, barred with black; pectoral similar, its base with a whitish area, which has a brown center, below which is a small black spot.

153. *Cremnobates affinis* Steindachner.

One specimen taken with the preceding.

Its coloration is much more uniform, the body being almost uniform dark brown; dorsal and anal black; caudal pale; side and lower part of head each with a large whitish area; pectorals pale, banded; dorsal with a single ocellus; anal with none.

154. *Cremnobates nox* Jor. & Gill.

One specimen taken with the seine.

The six known species of *Cremnobates* may be thus distinguished:

- a. First three spines of dorsal forming a separate fin, the second spine being much higher than any of those in the posterior part of the fin: snout slender, very acute; caudal pale; dorsal with two ocelli, anal with one.
 - MARMORATUS.
- aa. First three spines of dorsal scarcely forming a separate fin; none of them higher than the posterior spines; snout not very acute; anal without ocellus.
- b. Caudal fin pale, with a dark bar at its base; a notch between third and fourth dorsal spines; dorsal with one ocellus.
- c. Dorsal spines about 31.
- d. Membrane of third spine joining fourth spine at or slightly above its base.
- e. Lateral line, with 34 to 36 scales; dorsal and anal plain dusky....AFFINIS.
- ee. Lateral line, with 33 scales. Pacific coast.....MONOPHTHALMUS.
- dd. Membrane of third spine joining fourth spine much above its base. Lat. I.
 - 33. Pacific coast.....INTEGRIPINNIS.
- ee. Dorsal spines about 28; membrane of third spine joining fourth above its base: body with distinct dark cross bars.....FASCIATUS.
- bb. Caudal fin black; body chiefly black; head mottled with whitish; membrane of third dorsal fin joining fourth near its summit, the fin not notched; dorsal spines 30: dorsal with two ocelli.....NOX.

BATRACHIDÆ.

155. *Batrachus tau* (L.). *Toadfish*.

Coloration varying very much with the depth and the character of the bottom, the ground color ranging from light gray to brown. No specimens having the coloration of *B. pardus* were noticed. It is abhorred by the fishermen, who consider it very poisonous.

PLEURONECTIDÆ.

156. *Platophrys nebularis* Jor. & Gilb.

Common in shallow water, in sand.

157. *Citharichthys ocellatus* (Poey).

A single young specimen taken in a seine with the preceding. The resemblance in color of the two is very great.

158. [*Delothyris* species?]

Two small flounders, $1\frac{1}{2}$ inches in length, were obtained. These have exactly the technical characters assigned by Mr. Goode to the genus *Delothyris*. It is evident, however, that they are larvæ, and they probably belong to some species of *Platophrys* or *Citharichthys*.

Eyes on the left side; mouth small, without evident teeth; no trace of scales or of lateral line; pectorals on both sides present; ventrals of both sides free from anal; anal rays about 63; form ovate.

Coloration perfectly transparent, jelly-like, with slight greenish shades; five oblique bars running up and backward under dorsal and anal fins, on which they extend; these orange-red in color, and equally distinct on both sides of body.

Specimens of *Platophrys nebularis* as small as these are in the collection. These have the mottled color of the adult. It is probable, therefore, that this *Delothyris* is the larva of some species other than that.

The original *Delothyris pellucidus*, as its describer has suggested, is probably a larva, but its adult form is still probably unknown.

159. *Achirus comifer* Jor. & Gilb.

Rather scarce; in the sand on shallow bottoms.

160. *Achirus inscriptus* Gosse.

(*Monochir reticulatus* Poey.)

Common in shallow water on sandy bottom; several specimens taken.

Color in life olivaceous, covered with an irregular net work of blackish lines, these closer together on the head; some specimens crossed by a few vertical streaks, others without traces of these; dorsal and anal colored like the body, rather darker, with a paler edge; caudal abruptly whitish, immaculate; blind side immaculate, darker on the fins; hair-like appendages whitish.

Scales about head enlarged and fringed, especially on eyed side; lip of eyed side much fringed; interorbital width less than eye; upper

eye slightly in advance of lower; right pectoral of three rays, the middle ray somewhat longest; left ventral of one or two very small rays, in some specimens entirely absent; right side with scattered cilia; ventrals five-rayed, the right ventral joined to the anal.

Head, $3\frac{3}{4}$ in length to base of caudal; depth $1\frac{3}{4}$. D. 54; A. 40; Lat. l. 75 to 80.

Our specimens answer Günther's description of *Achirus inscriptus* rather better than Poey's of *Monochir reticulatus*. We think the species identical with both. This species, as well as *A. comifer*, belongs to Dr. Bean's genus *Baostoma*, but in view of the variations in the development of the pectoral, I regard it rather as a subgeneric section of *Achirus*. The European genus *Monochir* is quite different, having an elongate body, ventrals distinct from the anal, and peculiar scales.

161. Aphoristia plagiusa (L).

A single specimen taken with the seine in the sand.

Extremely pale, almost white in life, each scale with a blackish spot, these forming faint stripes which are narrowest on head. Fins plain, except posteriorly, where the stripes from the body extend slightly on them.

MALTHIDÆ.

162. Malthe radiata (Mitchill).

(*Lophius radiatus* Mitchill, Amer. Monthly Mag., March, 1818, 326. (Straits of Bahama.)

Malthe cubifrons Richardson, 1836.)

This species is rather common in the eel-grass about Key West. As elsewhere stated by us, it appears to intergrade fully with *Malthe vesperilio*, of which species it should be regarded as a variety.

Color in life dull olive-gray, the naked parts above with round black spots; sides and axillary region also with black spots; belly very pale salmon color, darkest on median line; mouth salmon color; Dorsal pale olive, mottled with light gray; ventrals and anal light salmon color; pectorals yellow below mesially, pale at base and tip; above yellowish white, more yellow toward tip and profusely spotted with black; caudal yellowish, its tip blackish, its upper half spotted with black.

BALISTIDÆ

163. Balistes carolinensis Gmelin. Turbot.

(? *Balistes capriscus* Gmelin.)

Common; considered a good food-fish, and brought almost daily into the markets.

Color in life olive-gray; a more or less distinct darker cross bar under front of second dorsal and one under last ray; some small violet spots on upper part of back; usually a ring of blue spots, alternating with olive-green streaks, about eye; violaceous marks on sides of snout; first dorsal spotted and clouded with bluish; second dorsal pale yellowish

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with clear sky-blue spots separated by olive-green reticulations, the spots arranged in rows; base of pectoral bluish, with olive spots; anal colored like soft dorsal; pectoral greenish.

164. *Monacanthus ciliatus* (Mitchill). *Leather-fish*.

Balistes ciliatus Mitchill, Amer. Monthly Mag. and Crit. Rev., March, 1818,
326. (Straits of Bahama.)

Monacanthus occidentalis Günther.

Monacanthus davidsoni Cope).

Extremely common about Key West, swarming in the eel-grass everywhere. No large ones were taken, the longest obtained being about 4 inches in length.

The color varies very much with the surroundings of the fish, from dull olive-gray to the most vivid grass-green. The markings are not well defined and not very constant.

Green, with white cirri on sides; a whitish longitudinal cloud behind pectorals; a pale band downward and forward from eye; lower side of head with darker cross-bands; dorsal and anal pinkish, with (usually three) darker spots at base; ventral flap edged with scarlet; caudal greenish, mottled with darker, and pale.

Some specimens show neither red nor green shades, and have vague dusky longitudinal stripes.

This species is more elongate than *M. hispidus*. Its ventral flap is much larger, although variable in size, and the caudal in the larger specimens is armed with recurved hooks. Small whitish dermal flaps are scattered about on the sides. It is most probable that *Monacanthus davidsoni* Cope is this species, although the coloration is usually less definite than Professor Cope's description would indicate.

165. *Monacanthus hispidus* (L.). *Leather-fish*.

(*Monacanthus setifer* Auct.)

Young specimens abundant in the eel-grass. A single large one (8 inches long) taken with a spear in deeper water.

It is rather less common than the preceding and passes through very nearly the same series of colors.

Grass-green or olive; back and sides with faint, irregular whitish spots; head plain; spinous dorsal and caudal green; second dorsal and anal translucent; adult less variegated; dull olivaceous, mottled with dusky.

In the adult the first two soft rays of the dorsal are filamentous, their length being a little less than that of the snout. None of the young show these prolongations.

Head, $3\frac{2}{5}$ in length; depth, $1\frac{3}{4}$. D. I, 32; A. 32. The young are slightly deeper ($1\frac{1}{2}$) proportionally than the adult.

OSTRACIIDÆ.

166. *Ostracion tricorne* L. *Cuckold; Cow-fish.*
(*Ostracion tricornis* and *quadricornis* L.)

Common, the young living in algæ near the shore, the adult in deeper water. Not brought to the markets.

Color light gray, tinged with olive; belly white; head and carapace with round spots of rather light blue, these sometimes forming more or less interrupted longitudinal stripes; about four of these stripes on cheeks; tail above with blue, brown-edged spots; dorsal olive, its base blackish; caudal olive, edged and mottled with light blue: anal similar; pectorals olive.

There seems to be no doubt that the *O. tricornis* and *O. quadricornis* of Linnæus refer to the same species. The former name, occurring earlier in the genus, should have precedence.

167. *Ostracion trigonum* L. *Shell-fish.*

With the preceding and equally common.

Olive gray; a very faint blue spot in the center of most of the scales; nostril in a yellow spot; boundaries of upper scutes blackish, of lower bluish; outlines of various scutes behind gill-opening black, forming a dusky area; a similar smaller dusky area on sides on level of eye; iris yellow; fins all pale olive; vent yellow; belly light olive, the outlines of the scutes bluish; base of pectorals yellowish.

168. *Ostracion triquetrum* L. *Rock Shell-fish.*

Scarce; only a few very young specimens taken.

Color in life light olive; covered everywhere above and below with round darker spots of greenish blue, about as large as pupil; fins plain; the caudal peduncle with a few spots.

TETRODONTIDÆ.

169. *Chilomycterus geometricus* (Bloch).

Moderately abundant; taken with seine in algæ.

170. *Diodon hystrix* L.

One specimen obtained; brought by a fisherman from the Tortugas.

171. *Tetrodon nephelus* Goode & Bean. *Swelling-fish.*

Common; young taken with seine in the eel-grass; adult, a foot in length, with hook and line from the fishing smaeks.

Adult olive brown, with numerous small light-bluish or greenish spots everywhere, many of them forming ocelli around darker spots of the ground color. Numerous scattered black spots as large as the pupil, one in axil below most distinct; some obscure dark spots along sides of belly, this region being flesh color, with pale rivulations; pectorals yellowish; caudal pale, usually with two dusky shades.

Young specimens are gray and olive above, much mottled with blackish; back with numerous irregular blue spots; iris coppery, the pupil green; belly white, grayish-brown along the sides; twelve round blackish spots along the boundary between sides and belly; a whitish bar at base of caudal; caudal with two bars of blackish olive and one of white; other fins plain; back and sides with whitish cirri.

These young specimens have the back and belly covered with rather large, not close set, stellate prickles as described in the original account of *Tetrodon nephelus*. Of the larger specimens some have prickles only on the back, others on the belly only; one or two only on a small area behind the eyes near the median line, while the majority of the largest are entirely smooth. There is no doubt that these specimens all belong to one species, and that this is the original *Tetrodon nephelus* of Goode & Bean. The loss of the prickles is probably to some extent dependent on age.

SPECIES NEW TO THE UNITED STATES COAST.

The following species contained in the present memoir had not been recorded from the coast of the United States at the time the collection was made. Those which were then new to science are printed in italics:

- Carcharias lamia* Risso.
- Nareine umbrosa* Jordan.
- Stolephorus perfasciatus* Poey.
- Stolephorus miarchus* Jor. & Gilb.
- Dussumieria stolifera* Jor. & Gilb.
- Clupea sardina* Poey.
- Synodus spixianus* Poey.
- Cyprinodon riverendi* (Poey).
- Tylosurus sagitta* Jor. & Gilb.
- Hemirhamphus unifasciatus* Ranzani.
- Siphostoma maekayi* Swain & Meek.
- Siphostoma miurum* Swain & Meek.
- Siphostoma erinigerum* Bean & Dresel.
- Mugil trichodon* Poey.
- Querimana gyrans* Jor. & Gilb.
- Atherina arcea* Jor. & Gilb.
- Acanthocybium solandri* Cuv. & Val.
- Seriola dumerili* Risso.
- Epinephelus guttatus* L.
- Lutjanus analis* (Cuv. & Val.).
- Lutjanus jocu* (Bl. & Schn.).
- Lutjanus caxis* (Bl. & Schn.).
- Hæmulon sciurus* (Shaw).
- Hæmulon flavolineatum* Desmarest.
- Hæmulon tæniatum* Poey.
- Calamus calamus* (Cuv. & Val.).

Calamus bajonado (Bl. & Schn.).
Diplodus unimaculatus (Bloch).
Upeneus balteatus Cuv. & Val.
Gerres lefroyi (Goode).
Gerres cinereus (Walbaum).
Pomacanthus aureus (Bloch).
Acanthurus cœruleus (Bloch).
Pomacentrus obscuratus Poey.
Scarus cœruleus (Bloch).
Sparisoma cyanolene Jordan & Swain.
Sparisoma xystrodon Jordan & Swain.
Cryptotomus beryllius Jordan & Swain.
Xyrichthys rosipes Jor. & Gilb.
Doratonotus thalassinus Jor. & Gilb.
Scorpæna grandicornis Cuv. & Val.
Gobiosoma ceuthæcum Jor & Gilb.
Eleotris smaragdus Cuv. & Val.
Cremnobates fasciatus Steindachner.
Cremnobates affinis Steindachner.
Cremnobates nox Jor. & Gilb.
Platophrys nebularis Jor. & Gilb.
Achirus comifer Jor. & Gilb.
Achirus inscriptus Gosse.
 Forty-nine species; seventeen new to science.

LIST OF ADDITIONAL SPECIES GIVEN ON THE AUTHORITY OF FISHERMEN.

In addition to the species collected by myself, I obtained information, apparently unquestionable, of the occurrence of the following species:

Mustelus canis (Mitchill).
Ginglymostoma cirratum (Gmelin). *Nurse Shark*.
Rhinobatus lentiginosus. Garman.
Acipenser sp. *Sturgeon*.
Elacate canada L. *Cavia*.
Nomeus gronovii Gmelin.
Centropomus undecimalis Bloch. *Snooks; Robalo; "Ravallie."*
Epinephelus drummond-hayi Goode & Bean. *Speckled Hind*.
Epinephelus punctatus L. *Nigger-fish*.
*Holocentrum ascensione** (Osbeck). *Squirrel-fish*.
Pogonias chromis L. *Drum* (scarce).
Sciæna ocellata L. *Red-fish* (scarce).
Chaetodon ocellatus Bloch. *Four-eyed fish*.
Bodianus rufus L. *Spanish Hog-fish*.
 In all, fourteen species.

* = *Holocentrum sogo* Auct.; *H. matajuelo* Poey.; *H. longipinne* C. & V.

The following: French Angel, Red-eyed Mullet, Black-fin Snapper (*L. buccanella*?), Glass-eye Snapper (*L. aurorubens*?), Black-a-moor, Rudder-fish, I did not see and am not able certainly to identify. The "Tally-wag" of the fishermen is *Serranus atrarius*, but it is said that it is never taken at the Keys.

SPECIES RECORDED BY OTHER AUTHORS FROM THE FLORIDA KEYS.

The following species not included in the present collection have been recorded from the Florida Keys on what I consider as good authority. Of those marked with the star (*) the writer has examined specimens from the Keys, either in the United States National Museum or in the museum of Yale College:

- Rhinobatus lentiginosus* Garman. (Egmont.)
- Narcine brasiliensis corallina* Garman.
- Manta birostris* (Walb.). (Punta Rossa.)
- **Sidera ocellata* (Agassiz). (Egmont Key.)
- **Cœcula bascanium* Jordan. (Egmont Key.)
- **Cœcula scuticaris* (Goode & Bean). (Egmont.)
- **Ophichthys intertinctus* Rich. (Egmont.)
- **Myrophis egmontis* Jordan. (Egmont.)
- **Opisthonema oglinum* (Le Sueur). (Egmont.)
- **Epinephelus apua* (Bloch).
- Epinephelus punctatus* (L.).
- **Hypoplectrus nigricans* (Poey).
- **Hypoplectrus gemma* Goode & Bean.
- Rhypticus bistrispinosus* (Mitch.). (Key West.)
- Hæmulon jenuigano* Poey. (Tortugas.)
- **Stromateus alepidotus* (L.). (Egmont.)
- Elagatis pinnulatus* Poey. (Key West.)
- **Nomeus gronovii* Gmelin.
- Chaetodon capistratus* L. (Key West.)
- **Chaetodon ocellatus* (Bloch.)*
- Glyphidodon declivifrons* Gill. (Marquesas Keys.)
- Xyrichtys psittacus* (L.). (Key West.)
- Bodianus rufus* (L.).
- **Gobiesox virgatulus* Jor. & Gilb. (Egmont.)
- **Batrachus pardus* Goode & Bean. (Egmont.)
- **Opisthognathus scaphiurus* Goode & Bean. (Tortugas.)
- **Gnathypops maxillosus* (Poey). (Tortugas.)
- **Blennius asterias* Goode & Bean. (Tortugas.)
- **Blennius favosus* Goode & Bean. (Tortugas.)
- Fierasfer dubius* Putnam. (Key West.)
- **Achirus brachialis* (Bean). (Egmont.)
- Aulostoma maculatum* Val.

* *Chaetodon bimaculatus* Bloch, the name *ocellatus* prior.

Monacanthus pullus Ranzani.

**Alutera schæpfi* (Walbaum). (Egmont.)

**Diodon liturosus* Shaw. (Egmont.)

Chilomycterus reticulatus (L.).

**Antennarius ocellatus* (Bloch & Schneider). (Egmont; Key West.)

Antennarius annulatus Gill. (Tortugas.)

Halieutichthys reticulatus (Mitchill). (Key West.)

In all, thirty-nine species.

The total number of species of fishes now known from the Florida Keys is, therefore, about two hundred and twenty. This number will probably be doubled when the species inhabiting deeper waters and those found about the growing reefs are known.

INDIANA UNIVERSITY,
April 14, 1884.

NOTE ON *Calamus proridens*, A NEW SPECIES OF CALAMUS.

By DAVID S. JORDAN and CHARLES H. GILBERT.

In our recent paper on the genus *Calamus* (Proc. U. S. Nat. Mus., 1884, 14-24), we have adopted the name *Calamus pennatula* Guichenot, for the "Little Head Porgy" of the Key West fishermen, supposing that the following clause in Guichenot's description (Revision des Pagels, p. 116) was a slip of the pen or some similar error: "Il a le corps moins haut (than in *C. penna*), plus allongé; sa plus grande hauteur (aux pectorales) n'ayant pas le tiers de la longueur totale du poisson."

Dr. H. E. Sauvage, of the museum at Paris, informs us that Guichenot's type, taken by Plée at Martinique has a total length of *m.*0.260; depth, *m.*.075; length of head, *m.*.067. Its height is contained therefore nearly $3\frac{1}{2}$ times in the total length and $2\frac{3}{4}$ times in the length to the base of the caudal.

The *Calamus pennatula* is therefore an elongate fish, while the species described by us is an especially short and deep one. We would therefore propose for the species represented by our specimens from Key West and Havana the name *Calamus proridens* Jor. & Gilb. The specific name is intended to refer to the peculiar forward-directed canines of the upper jaw.